THE U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
CENTERS FOR DISEASE CONTROL AND PREVENTION
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH

convenes the

WORKING GROUP MEETING

ADVISORY BOARD ON

RADIATION AND WORKER HEALTH

ROCKY FLATS

The verbatim transcript of the Working Group Meeting of the Advisory Board on Radiation and Worker Health held in Hebron, Kentucky on March 7, 2007.

C O N T E N T S

March 7, 2007

TRANSCRIPT LEGEND

The following transcript contains quoted material. Such material is reproduced as read or spoken.

In the following transcript: a dash (--) indicates an unintentional or purposeful interruption of a sentence. An ellipsis (. . .) indicates halting speech or an unfinished sentence in dialogue or omission(s) of word(s) when reading written material.

-- (sic) denotes an incorrect usage or pronunciation of a word which is transcribed in its original form as reported.

-- (phonetically) indicates a phonetic spelling of the word if no confirmation of the correct spelling is available.

-- "uh-huh" represents an affirmative response, and "uh-uh" represents a negative response.

-- "*" denotes a spelling based on phonetics, without reference available.

-- (inaudible)/ (unintelligible) signifies speaker failure, usually failure to use a microphone.

P A R T I C I P A N T S
(By Group, in Alphabetical Order)

BOARD MEMBERS

EXECUTIVE SECRETARY
WADE, Lewis, Ph.D.
Senior Science Advisor
National Institute for Occupational Safety and Health
Centers for Disease Control and Prevention
Washington, DC

MEMBERSHIP

GIBSON, Michael H.
President
Paper, Allied-Industrial, Chemical, and Energy Union
Local 5-4200
Miamisburg, Ohio

GRIFFON, Mark A.
President
Creative Pollution Solutions, Inc.
Salem, New Hampshire

MUNN, Wanda I.
Senior Nuclear Engineer (Retired)
Richland, Washington

PRESLEY, Robert W.
Special Projects Engineer
BWXT Y12 National Security Complex
Clinton, Tennessee

IDENTIFIED PARTICIPANTS

ALBERG, JEANETTE, SEN. ALLARD
BRACKETT, LIZ, ORAU
BROEHM, JASON, CDC WASHINGTON
BUCHANAN, RON, SC&A
CHANG, CHIA-CHIA, NIOSH
CHEW, MEL, ORAU
ELLIOTT, LARRY, NIOSH
FALK, ROGER, ORAU
FITZGERALD, JOE, SC&A
HOFF, JENNIFER, ORAU
HOMOKI-TITUS, LIZ, HHS
HOWELL, EMILY, HHS
JESSEN, KARIN, ORAUT
KATZ, TED, NIOSH
KOTSCH, JEFF, DOL
LABONE, TOM, ORAU
LIPSZTEIN, JOYCE, SC&A
LITTLE, CRAIG, ORAU
MAKHIJANI, ARJUN, SC&A
MAURO, JOHN, SC&A
MCFEE, MATT, ORAU
MEYER, BOB, ORAU
NETON, JIM, NIOSH
RICH, BRYCE, ORAU
SHARFI, MUTTY, ORAU
SHIELDS, LASHAWN, NIOSH
SMITH, MATTHEW, ORAU
SUNDIN, DAVE, NIOSH
ULSH, BRANT, NIOSH

P R O C E E D I N G S

(9:30 a.m.)

WELCOME AND OPENING COMMENTS

DR. LEWIS WADE, DFO

DR. WADE: We're about ready to begin. This is Lew Wade, and this is a meeting of the work group on Rocky Flats site profile and SEC petition. That group is most ably chaired by Mark Griffon, members Gibson, Presley and Munn. Ms. Munn and Mark are here in the room, and by voice I understand that Presley and Gibson are on the phone. Is that correct?

MR. GIBSON (by Telephone): Yes.

MR. PRESLEY (by Telephone): This is Bob Presley.

DR. WADE: Are there any other Board members on the call?

(no response)

DR. WADE: Any other Advisory Board members on the call?

(no response)

DR. WADE: Clearly then we don't have a quorum of the Board, and that's good. We will

proceed with the work group meeting.

What I'm going to do is ask for Board members to identify themselves, then NIOSH team members, including the ORAU team, SC&A team members to identify themselves. Then I'll ask other feds. I'll ask petitioner and worker reps to identify themselves, members of Congress or their representatives. And then I'll ask any others who would like to be identified for the record.

A little bit of talk about phone etiquette to begin with, special attention today because Ray is not with us. Shane is with us and without Ray I think we need to be particularly careful to identify ourselves when we speak and speak clearly.

Also, we've lived through all kinds of background noises from dogs barking to babies crying to elevator music. So keep an eye towards, an ear towards what goes on in your background. Mute when you're not on. When you are speaking, don't speak into anything but the handset. Don't try and use a speaker phone. It creates all kinds of interference.

As we go through the Board member

identifications, NIOSH and SC&A team member identifications, I would ask that all of those individuals identify their conflicts, if any, with regard to the Rocky Flats site. So we'll start again with Board members, and here we have...

MR. GRIFFON: Mark Griffon with the Advisory Board.

MS. MUNN: Wanda Munn, Advisory Board, no conflicts on Rocky.

DR. WADE: And on the line?

MR. GRIFFON: No conflicts either for Mark Griffon.

DR. WADE: Mike?

MR. GIBSON (by Telephone): Mike Gibson, no conflicts.

DR. WADE: And Robert?

MR. PRESLEY (by Telephone): Robert Presley, Board, no conflicts.

DR. WADE: And I assume there are no other Board members within the sound of my voice.

(no response)

DR. WADE: Okay, let's start with NIOSH team members here around the table.

MR. ELLIOTT: Larry Elliott, no conflict.

DR. ULSH: Brant Ulsh, NIOSH team, no conflict at Rocky.

DR. WADE: Okay, ORAU team.

MR. MEYER: Bob Meyer, no conflict, NIOSH team.

DR. LITTLE: Craig Little, no conflict.

MS. JESSEN: Karin Jessen, no personal conflict.

MR. McFEE: Matt McFee, ORAU team, no conflicts at Rocky.

MR. SHARFI: Mutty Sharfi, no conflicts at Rocky.

MS. HOFF: Jennifer Hoff, no personal conflicts.

DR. WADE: Other NIOSH/ORAU team members on the telephone?

DR. NETON (by Telephone): Jim Neton, no conflict.

DR. WADE: Good morning, Jim.

MR. FALK (by Telephone): This is Roger Falk, and yes, I have a conflict.

DR. WADE: Good morning, Roger.

MR. SUNDIN (by Telephone): This is Dave Sundin, no conflict.

MS. BRACKETT (by Telephone): Liz Brackett

with the ORAU team, no conflict.

MR. CHEW (by Telephone): Mel Chew with the ORAU team, no conflict.

DR. WADE: Good morning, Mel, welcome.

MR. RICH (by Telephone): Bryce Rich with ORAU team, technically conflicted.

MR. LABONE (by Telephone): Tom LaBone, no conflict.

DR. WADE: Other members of the NIOSH/ORAU team?

MR. SMITH (by Telephone): Matt Smith, ORAU team, no conflict.

DR. WADE: Last chance.

(no response)

DR. WADE: SC&A?

MR. FITZGERALD: Joe Fitzgerald, no conflict.

DR. MAKHIJANI: Arjun Makhijani, no conflict.

DR. WADE: On the telephone?

DR. MAURO (by Telephone): John Mauro, no conflict.

DR. LIPSZTEIN (by Telephone): Joyce Lipsztein, no conflict.

DR. WADE: Good morning, Joyce.

MR. BUCHANAN (by Telephone): Ron Buchanan, no conflict.

DR. WADE: Good morning, Ron.

Other members of the SC&A team on the line?

(no response)

DR. WADE: Are there other federal employees on the line by virtue of their employment?

MS. HOMOKI-TITUS: Liz Homoki-Titus with Health and Human Services.

MS. HOWELL (by Telephone): Emily Howell with Health and Human Services.

MS. CHANG (by Telephone): Chia-Chia Chang with NIOSH Director's office.

MR. KATZ (by telephone): Ted Katz with NIOSH.

MR. BROEHM (by Telephone): Jason Broehm, CDC Washington office.

MS. SHIELDS (by Telephone): LaShawn Shields with NIOSH.

MR. KOTSCH (by Telephone): Jeff Kotsch, Department of Labor.

DR. WADE: Welcome, Jeff.

Other feds here by virtue of their employment?

(no response)

DR. WADE: Representatives of workers, petitioners, those directly involved in Rocky Flats?

(no response)

DR. WADE: Workers, petitioners, those directly involved at Rocky Flats?

(no response)

DR. WADE: Members of Congress or their representatives?

MS. ALBERG (by Telephone): Jeanette Alberg with Senator Allard's Office in Colorado.

DR. WADE: Good morning.

Other Congressional representatives?

(no response)

DR. WADE: Any others on the line who would like to be identified for the record?

(no response)

DR. WADE: Okay, I think we're done with our introductions. Mark?

MR. GRIFFON: I see we have another small working group for Rocky Flats discussion. I e-mailed, but I'm not sure everyone has this, but it's a very brief outline of an agenda to start us off, some of the primary issues that

remain on, frontloaded on this agenda.

WORKING GROUP UPDATE

Well, actually, before we get into those items it might be worthwhile just to go through sort of where we're at with this whole process, winding down toward a final evaluation report from SC&A. And it's been a long haul obviously, but I think we've made quite a bit of progress, and I just want to point out some of the items that we've gone through in this process.

Item number one, the Super-S, which has been on our matrix forever, I think we now have agreement on the model and I think the latest news from SC&A -- I don't want to misstate this -- but I think that SC&A has now gone through the supporting cases that were not used as design cases. And they've made a determination that those also would be bounded by the design cases. So I think we've basically completed our review of Super-S and SC&A's in agreement with NIOSH's model and approach. Is that correct, Joyce?

DR. LIPSZTEIN (by Telephone): Yes.

MR. GRIFFON: Also, with the second item,

and this item involves three sort of sub-items, but data reliability, safety concerns and logbooks reviews. The bottom line conclusion, I think there were, there still are some disagreements on some individual items within those reviews.

But the bottom line sort of question was do we see any systemic problems, systemic, you know, problems. And SC&A has concluded on those three, that three-pronged review that they haven't identified any systemic problems through that review comparing those items with the individual radiation files. So I think that's a lot of progress. That was a lot. There were several items on that, involved in that.

The third item, the other radionuclides, I think, well, I know that we're down basically in our discussions to thorium, which we'll have on the agenda today. But other than that we, NIOSH and the ORAU team, did quite a bit of research on these other radionuclides, and SC&A was comfortable with the approach described for the various other radionuclides on that original list. So

that's off the table.

The D&D worker question I think with as we've evolved here and NIOSH expanded their coworker model to cover that D&D period, and again, that gave us any comfort that there would be a bounding approach for these D&D workers with regard to internal exposures. So I think that D&D question is no longer an ongoing item.

MR. FITZGERALD: Yeah, and I think we'll talk about the O-14 extension that was the one remaining issue, and Joyce is on the phone. But I think that's substantially completed.

MR. GRIFFON: And the last thing, I guess, would be the coworker models for internal and external dose reconstruction. And I think that we had some disagreements, I think we've essentially concluded that any differences in the model basically at this point would be site profile issues, not necessarily SEC issues. So those models themselves, the coworker models I think are basically, there's agreement there, or they're not SEC issues.

And I want to qualify that just a little bit to say that that's not withstanding

the ongoing concern about the data that populates those models. So we still have some questions on the table about the data in those models. But the models themselves seem to be, I think we've concluded our discussions on those.

So I just wanted to point out that as in introduction that we have made some progress. Sometimes I think we lose sight of that.

DR. WADE: Mark, can I ask you, your second was a brace of three: logbooks, safety concerns, and what was the third?

MR. GRIFFON: Data reliability.

MR. FITZGERALD: Data integrity.

MR. GRIFFON: Data integrity, I'm sorry.

MS. MUNN: And that's more than just a little progress. That's a staggering number of items that have been addressed. I don't think it's possible to be any more thorough than this group has been with respect to these issues.

DR. WADE: All have been well served by this group of people.

MR. GRIFFON: So I think where we stand in

looking at the agenda for today, the items I wanted to look at first were the question of completeness, data completeness. And I know it's been a separate agenda item, so I should have probably separated this '69 data question, but those two sort of tie together a little bit.

But those two items, then the thorium will be our next thing to discuss. And then the third item on my agenda is some updates on these other items. And some of those may be like Super-S, you know, I think that will be a fairly quick update, but I think SC&A's completed that review and we can just hear SC&A's report on that.

The last item I have on my agenda, which I brought up at the last Advisory Board meeting, and this is this proof of process question. And we had some examples early on I think that were provided to the work group. But I feel like, well, first of all, I'm not sure that those original examples use the current coworker models. I don't even know if coworker models were around when those were out there so I think we might have to re-

examine...

And parenthetically, I gave some possible examples of what I might want to see a sort of proof of process on, and we can discuss that further. I'm not sure if my list is exhaustive or appropriate. Those were some things that came to my mind that we may want to see, and we may, I would consider if NIOSH -- we can discuss this more later -- but if NIOSH could identify case numbers that use certain approaches.

I don't think, you know, we can keep those case numbers and the Privacy information off the record, but if they can point us at those cases, I think that would be more than adequate to meet that need so I don't see additional work necessarily other than identifying the cases.

All right, to start off, well, first of all, is there anything I missed on the agenda or any big items? There might be some.

MR. PRESLEY (by Telephone): Bob Presley, what about the new item on here, the wound scenario question?

MR. GRIFFON: Yeah, under these updates the

wound scenario question came up at the last work group meeting, and that was something that was brought up about specifically whether the sort of chronic inhalation approach would be bounding of a wound scenario when the wound, when there was no record of there being a wound so they didn't know it was a wound.

And I think Mutty and Jim Neton talked about maybe examining that and seeing if, in fact, it was in all cases going to be bounding. So we had a brief discussion on that. I don't know if you, I thought we had it as an action item, but I was going to list this as an updated action item. Not a big hitter I don't think but ...

MS. MUNN: I was surprised when I saw it because I didn't remember that we had an action on that. I know there was some discussion about it, but --

MR. GRIFFON: I'm pretty sure I'm right. Brant, am I wrong on that? I thought Jim --

DR. ULSH: I do recall that we talked about it. I don't know --

MR. GRIFFON: I thought Jim said, you know, we need to look at this and make sure it is

bounding and maybe I didn't capture it.

DR. WADE: I think they're ready.

MS. MUNN: It just wasn't on my list of --

DR. NETON (by Telephone): I did discuss this with Dave Allen awhile ago, and I don't have a complete report to talk about, but maybe the two experts we have on the phone, Liz and Tom LaBone might be able to help us out a little bit.

MS. MUNN: Is the volume up as high as we can get it on that?

DR. WADE: Jim, could you just count to ten or something like that?

DR. NETON (by Telephone): Pardon me?

DR. WADE: Could you count for us? We're going to get the volume up. We're having trouble hearing.

DR. NETON (by Telephone): I was just saying I've discussed this with Dave Allen briefly, but I'm not prepared to provide a detailed report, but I think we have some, Liz Brackett and Tom LaBone on the phone. They might be able to help us out when we come to it, when we get there.

DR. WADE: Okay, thank you. That was much

better.

DATA COMPLETENESS

MR. GRIFFON: So to start off the data completeness report, and I think this is the 52 cases that were reviewed. And I forget the breakdown. There were some production workers and some randomly selected, but it totaled 52 individual radiation files were reviewed.

And I guess the purpose of the, the overall purpose of this was to make sure that there was, that the data within radiation files in general for Rocky Flats workers for the entire class was complete enough, was adequate for dose reconstruction. And I think that I just wanted to make sure that we discuss it. We're looking at can we do dose reconstruction for the entire class at hand here for all organs of interest.

So that's kind of where, that was our rationale for doing this sampling in the first place was to see if we randomly select and we picked claimants' files only because they were more readily available rather than picking radiation files from out of the database. And it would have been a lot more work to find

those radiation files. So SC&A provided a report. I think we all, that was submitted to NIOSH, ORAU at the last work group meeting. Is that correct?

MR. FITZGERALD: Yeah, --

MR. GRIFFON: Or shortly before the meeting?

MR. FITZGERALD: -- the scoping of that was very specific of the work group on what we were to cover. It was just strictly --

MR. GRIFFON: Yeah, the scope of that was basically for -- just a point of clarification, I guess -- SC&A's scope was to sort of do a screening, look for these data gaps and identify them. And I think, at least it was my understanding, and I'm pretty sure that we had discussions about this, that these data -- and we even discussed it in the last work group meeting -- that SC&A did identify some data gaps, but they did not walk through the work histories or compare to the radiation monitoring policies or practices of that time period.

Rather, they were just going to hand that over and say, okay, NIOSH, you've got more of that information available anyway. So

these are sort of potential, you know, gaps but maybe not unexplainable gaps. But that is how it was set up.

And we've now got a response from NIOSH which came in, I'm not sure on the dates again, a week or so ago.

MR. ELLIOTT: Yeah, a week ago.

MR. GRIFFON: So I guess we can ask, maybe Brant can summarize what the findings are on that.

DR. ULSH: I do have copies of our report on the data completeness issue and a separate report specifically on 1969 and '70. I'll circulate those around the table if anyone wants to have a copy while we talk about this.

And there is one other handout that I want to send around, but I have to issue a note of caution here. This last handout contains what are called job history cards, and there is Privacy Act material in here. So feel free, Board members, SC&A, to take it home if you'd like to, but don't leave it laying here on the table. Get it back to me if you're not going to take it.

DR. MAKHIJANI: Brant, are you going to make

this electronically available?

DR. ULSH: It is electronically available now.

DR. MAKHIJANI: On NOCTS?

DR. ULSH: Yes. All the job --

DR. MAKHIJANI: No, no, I mean the compilation. I know the individual histories are there on NOCTS. This particular Word document, are you going to, the new one, the new one that you said you're sending around?

DR. ULSH: Arjun, there are three things coming around. The first two are our reports.

DR. MAKHIJANI: Which I have.

DR. ULSH: Which you have. And the last one is just an example job history card. That's all.

All right, so just to add a little bit to Mark's summary --

MS. HOMOKI-TITUS: Brant, can I just follow up?

DR. ULSH: Yes, please.

MS. HOMOKI-TITUS: This document that Brant just sent around that has all of the Privacy Act information in it, please be very careful when you're referring to it on the record

because there's a lot of information that could make it possible to identify an individual. So you need to be careful about what information you pull out of here when you're making statements on the record.

DR. ULSH: I've blacked out things like the name, social security number and all that, but the job exposure -- sorry -- the job history itself is specific to a person so like Liz said, let's just refer to that in the abstract.

DR. WADE: And I might make a brief comment as well. Mark mentioned that this has been a long and arduous process, but it's been a rapidly evolving one. So the work group decides to pursue a certain line of inquiry and documents are generated by NIOSH, documents are generated by SC&A, not in all cases do we have the ability to have those documents reviewed.

So documents will come in front of the working group, in front of the NIOSH and SC&A participants, that haven't been scrubbed for Privacy Act consideration. That serves the process. Certainly, we'd like to have

everything scrubbed and available to everyone when we discuss it, but that's not always possible as this is very rapidly evolving.

So again, to those people who are not part of NIOSH, SC&A, the teams, the work groups, some of these documents might not be in your possession, and we apologize for that. But again, rather than delay the process or slow the process, this is the course of action we've chosen, and I think it's the appropriate course of action. Thank you.

DR. ULSH: To go to our report on data completeness, the data completeness evaluation, as Mark mentioned the 52 case files that were selected by SC&A for review consist of -- let me make sure I get this right. There were 32 randomly sampled, and then there were 20 that we categorized as individuals who had received high cumulative exposures. So that totals 52.

SC&A started out by reviewing 12, and I think sometime in December presented those results. And it was agreed by the working group that we should expand the scope of the review. And that's how we wound up with 52.

In January, SC&A, on January 10th, SC&A issued their report on their data completeness evaluation of the 52 files. And then as Mark mentioned, the NIOSH response to that was issued last week, Wednesday. So that is out now.

As Mark mentioned, and I think Joe also mentioned, SC&A's analysis consisted of categorizing the time periods for these workers when they had monitoring available, and time periods when there was no monitoring records in their file. And NIOSH agrees that there are time periods when workers don't have monitoring records in their file.

I think where we perhaps diverged is the significance of those. In the main body of SC&A's report, they really did not talk about the significance of the data gaps as is appropriate because you can't really tell what the significance of those gaps are without doing the kind of analysis that NIOSH has now done where you look at the radiation files in detail and also at the job history cards which are available in NOCTS for numerous employees.

It's only after those kinds of

reviews, reviews of that kind of data that you can come to any conclusion about whether or not any data is missing. And that's where I think that we took issue with some of the conclusions of SC&A's report when there were gaps or when there were periods when there was no monitoring data available. And the conclusion was then drawn that this data was missing.

And I cautioned about that a couple of times in the past, and that has, I think our analysis has shown that that caution was justified because what we found of the 52 cases, first of all it, it should be noted that dose reconstructions had been completed for 48 of the 52 cases. There are four that are still in process.

There are none identified that we've concluded we can't do dose reconstruction. And it's also worth noting that I think there was only one of those that used coworker data.

DR. NETON: Correct.

DR. ULSH: Correct? Okay. And for these 52 cases we found that 60 percent of them had a probability of causation greater than 50

percent.

Now for the cases, we looked at each individual case, each of the 52, and what we found was where there were periods with no monitoring data, the most common explanation, well, there were two that were pretty common. Number one, the employee wasn't at the site during the time when there was no monitoring data, and so you certainly would not categorize it as missing data. I mean, that's appropriate that there is no monitoring data for them in that situation.

The other common occurrence was if you look at the example job exposure card that I've sent around. Now these cards are available in NOCTS for employees of the prime contractors. So throughout Rocky Flats' history, Dow employees, I think Kaiser came too late. These cards -- now this is just my anecdotal recollection -- these cards were available up into the 1980s, and I didn't see any for the latter part of the '80s and into the '90s. So I think they discontinued the use of these cards.

But if you take a look at the example,

what you can see here is it lists occupations, and in many cases, well, it lists the department where they worked. I don't want to talk in detail, for Privacy Act reasons, about this example, but I just wanted you to see the kind of information that is available for many of the claimants. This was one resource that we relied upon to determine whether or not the periods with no monitoring data represented missing data or whether they were readily explainable.

Now there are certain employees where we don't have these cards, for instance, subcontractors. We don't have these cards for subcontractors so we got clues to their employment of information in the radiation files themselves. You'll see, I don't know.

I don't remember the name of the actual document that's in there, but it's kind of like a pay stub or that kind of thing. And it tells what company they worked for. S&W was common, Swinnerton & Walberg (ph) and also Lumnes (ph). So we get data on those people, on the subcontractors, from a different source than these cards. But by and large we're

talking about employees of the prime, so we've got detailed job exposures -- I'm sorry, I keep saying that -- job history cards.

And what we looked at in these job history cards were when SC&A identified a period where there was no monitoring data, and we also looked at the file and saw the same thing, we asked ourselves, well, is there a reasonable explanation considering the badging policies in place at the time for this person not to be monitored. Or is it a situation where you would expect this person to be monitored because he had a significant exposure potential.

And an example might be an operator in Building 71. If you looked and there was a period where that person was not monitored, and you determine that he was onsite, that would be kind of surprising if he didn't have data because those were some of the higher employment, higher exposure potential employment positions at the site.

On the other hand if you looked and you saw job titles and work locations that did not indicate high exposure potential, an

example might be a janitor, then it might be entirely reasonable that that person would not be monitored because over time with the badging policies in place at the site, people who had the potential to receive greater than ten percent of the tolerance level were required to be monitored. If they weren't expected to have that exposure potential, then it was not mandatory that they be monitored.

So what we found in the 52 cases, keep in mind that these 52 cases represent hundreds of man years of monitoring data. And they also, there are two types of data that were looked at, external dosimetry data, that's the film badge or TLDs that you wear to monitor external radiation. And then there was also internal monitoring data, bioassay data. So this would have been urinalysis, lung counts and those kinds of things.

So if you take 52 individuals, multiply by the number of years that they were employed, you get hundreds of man years of monitoring data, both internal and external. And what we found was that there was one gap where it represented missing data. There was

one person who had one year of external monitoring data that was not present and that was clearly noted in his file. And it's legitimate to conclude in that case that is missing data.

There were no other cases of missing data. There were ready explanations available. Either the person wasn't onsite during the time or he was working in a position where there was low exposure potential and would not be expected to be monitored. Therefore, we concluded that the monitoring data for these 52 individuals was essentially complete with that one exception of one year of external monitoring data.

It should also be noted, as I mentioned, that for that one case where there was legitimately missing data, we were able to complete a dose reconstruction with a probability of causation of greater than 50 percent. Therefore, there is not a single case among these 52 where the data is missing, except for that one instance, and more importantly, where the data is so incomplete that we could not complete a dose

reconstruction.

So that was the conclusion of our report on that. Now, Mark, I can hold off. Do you want to discuss this before I get into '69 and '70?

MR. GRIFFON: Yes, I guess we'll take them one at a time.

Joe?

MR. FITZGERALD: Yeah, I'm going to have Arjun address this. But I just want to clarify on this issue of scope and charge that we approached this from a standpoint of the working group's express request to develop a sampling plan and to actually sample the, at random, the frequency and extent of gaps.

Now these gaps were initially identified in the 12 cases that I think Arjun and Ron presented early in the fall. And we got into November the charge from the work group was to expand that through a sampling plan and to focus on identifying gaps in terms of frequency and magnitude.

The charge beyond that was simply to then provide that information to NIOSH and for NIOSH then to -- as they have -- to

characterize the implications and the explanation for these so-called gaps. And again, I think we appreciate and were very careful about the distinction between ascribing and implication that the data's missing for a gap. So the context of our sampling was to identify gaps.

Arjun.

DR. MAKHIJANI: Thank you. Yeah, in regard to this missing gaps, I agree, Brant, that it came up and there was that caution. And we actually took that caution quite seriously. If you look at the report on completeness, the word missing actually doesn't appear in the report itself.

Unfortunately, in one summary table the word missing was left in the summary table numerous times and then one other place where it's in a comment. And it's clearly inadvertent. The word missing actually doesn't appear in our analysis. And as I said, it appears inadvertently in one summary table. That's it.

The individual cases where there are gaps in the data in the tables themselves of

the cases are all identified as gaps. And so it's rather surprising that when NIOSH quoted, cited SC&A's individual case characterization, it was noted that we said it was missing data when the individual line items actually say gaps. And so I thought we settled that issue.

And the analysis actually, we did look at one aspect of the jobs in the sense that we did conclude that the non-monitored workers were not in plutonium areas and that the external gaps were, dose gaps were concentrated in the 1950s. And so along with identification of the gaps, that much was handed to NIOSH.

Our overall conclusion is a little bit different than what was characterized by NIOSH. I'd like to mention that briefly. NIOSH concluded that our position seems to be that any lack of complete data record automatically makes it impossible to reasonable, to make dose when my reading of what we said was sort of the opposite of that.

I thought we said that the gaps don't indicate that you can't, you shouldn't automatically conclude that you can't estimate

dose. I just would like to read that for the record because in my impression, what we explicitly said was the contrary to what's in NIOSH's report.

We said it might be possible to fill in the gaps using the data from Rocky Flats and other sites for uranium, external, shallow and deep dose provided that additional analysis as regards claimant favorability relating to actual working conditions is carried out. However, no firm conclusion is possible at the present time since NIOSH has not done the requisite analysis including, for instance, about shallow dose exposure conditions in the uranium foundry operations in the 1950s.

So we explicitly have an open door about the possibility of dose reconstruction to fill in the gaps using Rocky Flats and other data. So I think, well, I leave it to NIOSH whether they want to amend the report. But at least our report is very clear on that point.

We haven't had a chance to, there's a lot of paper on the table and, of course, we

will be completing our report after a full reading of that. So it's not possible to fully respond to everything. But I just wanted to make a few observations about what's on the table from NIOSH's side and its analysis, and what we had been looking for when we described the gaps and the extent of the gaps.

So the main point that NIOSH has made about completeness and dose reconstructability is that almost all, in the 52 cases almost all the dose reconstructions are complete; and therefore, this is a demonstration that there's a feasibility of dose reconstruction with sufficient accuracy under 42-CFR-83. And as I see it those two propositions are kind of different because 42-CFR-82 allows you to do a lot of things, but they don't fall under the rubric of 42-CFR-83.

Specifically, out of these dose reconstructions, actually, may I read a couple more that are completed at least in our preliminary evaluation? Maybe they're not settled yet with the claimants, but there is a dose reconstruction file (inaudible) 52. And

under those 31 have been compensated and 19 have not been compensated.

Out of the 31 that were compensated, 28 were minimum dose reconstructions. Minimum dose reconstructions by definition are not bounding dose reconstructions. Research had been cut short for efficiency purposes. This is beside the point for demonstrating a bounding dose reconstruction under 42-CFR-83 where you have to show that you have an upper limit reasonable dose that can be used for compensation or denial.

So of these 28 there were some partial dose reconstructions that were done using only internal dose, some only external dose. One was actually only medical dose which we have not discussed in an SEC context, and one was external and medical both.

Of the ones that were denied there were 19. And out of that, 15 were maximum efficiency doses so far as we could see. And this is a preliminary reading. We haven't had a chance to actually examine all of these things in detail and a few all have contrary information -- and please correct me -- but as

we noticed in 15 out of the 19 cases, TIB 002 had been used which is explicitly an efficiency tool to calculate, to cut short research to be able to deny somebody without undue delay.

And this is not a dose reconstruction approach that would be applicable for calculating a bounding dose. Efficiency methods of cutting short research belong in 42-CFR-83 and not under 42-CFR -- I mean 82, and not under 83 for the purpose of demonstrating the ability to do a dose reconstruction. And we found coworker data was used only in two cases in, rather than one. Maybe it's one that's not yet been completely settled with the claimant so far as our file is concerned.

In actually using the data, and we haven't gone through all of it as yet, it appears that the zeros and gaps in the record seem to have all been treated as being under the limit of detection because the coworker model was used only twice I think. And we haven't actually looked to see as to how it was applied and whether it corresponded to any

of these gaps.

So in brief, even if dose reconstruction had been completed under 42-CFR-82 and without making any comment about those dose reconstructions themselves, it doesn't address the issue that we raised which was specific to the kinds of workers who were, the class of workers who were not monitored, the exposure potential for some of those workers which according to documentation in the early periods may have been high.

And we specifically called attention to foundry workers in the 1950s. So far as we could tell none of the 52 cases had any foundry work in the 1950s. We may be wrong. We have to look at the job category more carefully. But on a preliminary look, I did ask Ron Buchanan to look at it.

Ron, are you on the phone?

MR. BUCHANAN (by Telephone): Yes, I'm here.

DR. MAKHIJANI: Ron, could you describe your search a little bit, please?

MR. BUCHANAN (by Telephone): This is Ron Buchanan with SC&A. I went through the 52 cases and looked at the personnel exposure

cards which I think you're calling the job history cards and to see what their job assignments were and usually that's gives the building and a job title. I looked through those 52 cases and I do not find any foundry workers in Building 44 or 444 in the 1950s. I found one worker that had some work in .

DR. MAKHIJANI: So the issue on the table in data completeness in regard to external data in the '50s identified a sub-class of workers hadn't been addressed so far as we can see in the NIOSH analysis. There was one piece of data in regard to foundry workers that is in NIOSH's report -- and if there are more, Brant, please correct me because I've gone through a lot of paper in a short period of time.

That piece of data related to the mean doses for foundry workers in 1968 and only the mean doses were provided. The distribution was not provided. There's no substantive discussion on how that relates to the 1950s or establishment of working conditions in the 1950s. And that's particularly relevant

because (ph) document from 1982 that was quoted in SC&A's analysis identified particularly the early years that Building 444 as being particularly problematic.

Now, NIOSH seems to not have accepted that analysis in the sense that dose measurements are regarded as contact doses that don't necessarily indicate high exposure potential. And then the high dust identified in the document is also dismissed essentially. I don't want to unfairly characterize it so let me just kind of refer to the NIOSH document itself. Give me a moment to find it.

And I'm just reading it as it is written there. The concern expressed about dust high in Thorium-234 and PA-234M would seem to be unfounded. First, given the nature of foundry work, it seems unlikely that large amounts of dust would have been created that contained these two radionuclides. Second, very little skin would have been exposed for dust accumulation. Finally, given that any contamination on the skin was easily removed by washing, it would not have accumulated.

Now the first statement about the concern regarding dust being unfounded is contradicted largely by the document. It said that dust which was generated in burnout and breakout areas and settled on various pieces of equipment.

And from there there were additional beta radiation fields generated. This also resulted in excessive dust in the atmosphere. Now, he feels it was well handled, but this appears to be primary documentation from Rocky Flats about high dust in the 444 atmosphere and also the high dose potential is documented here.

So we're not, at least on this first reading, in accord with NIOSH's statement about exposure potential. There is some documentation about foundry workers from 1969, if I can just refer to that even though it's in the other paper because it directly concerns foundry workers. Maybe we can just discuss the foundry issue as a whole.

That's in an unnumbered table, but it's on page, there's no page numbers on this document so it's on page three anyway. The

title of the table is 444 Foundry Workers Exposures by Year Penetrating Skin Dose in Millirem. It shows four quarters of data for 1968 and four for 1969. And it shows that the workers had zeros in 1969, the first three quarters, essentially indicating the kind of zeros we've been talking about, that their badges weren't read and zeros were entered.

And then it shows a fourth quarter measurement for the workers, which were done for these seven foundry workers. And actually this data indicates that this idea that it was generally ten people who were not badged or people who were badged and their badges were not read had less than ten percent of their exposure potential, this data actually doesn't validate that assumption.

Now, we went through this at Y-12 in that, you know, they may have made their judgment with the best of intentions, but as the data stand one worker did not return their badge. The data for six workers in the fourth quarter of 1969, out of those six workers, four of them had more than ten percent of the exposure potential for penetrating dose

because ten percent of the exposure potential for the quarter is 125 millirem. And for shallow dose one had more than the ten percent of the exposure potential out of six.

That's a limited set of data, but it's not a very good validation of the idea that exposure potential was generally less than ten percent, and that the calls that were made for those who were not badged, or in 1969 those whose badges were not read, were correct. And so the implication of this for the 1950s when many of the workers were not badged don't actually justify the conclusions that NIOSH has made that the concern about the exposure potential were unfounded.

Specifically, the idea that when there are zeros in the records they can be replaced by LOD or limit of detection or the limit of detection divided by two for the gaps does not appear to be justified as a uniform policy. So that the zeros that are there, the ones that are gaps, have to be distinguished from the ones, from the badges that were read and where the reading was below significant detection. So it's a fairly significant issue

there.

The other sort of example that NIOSH has provided about the ability to do dose reconstruction and the availability of data to fill in the gaps relates to Building 81, enriched uranium, and actually provided more data here for 1960s. And that's on page five of NIOSH's completeness report I believe. I have my version with all my comments on the side so I don't know whether my page numbers are right.

DR. ULSH: I think you're correct, Arjun. You're talking about the table on page five, right?

DR. MAKHIJANI: It's at the bottom there. And so it does appear that the Building 81 workers have identified and identifiable doses. And in the example given we agree with NIOSH that the coworker models weren't applied in the example given for that year. The coworker model doses are clearly more than the extrapolated doses for one year from the fourth quarter.

But as NIOSH says, there were no data for this group of workers in the 1950s. And

the main problem identified for external dose in terms of data gaps at Rocky Flats was for the 1950s. NIOSH has given two reasons, and then there's a similar demonstration for '61, and we agree with that demonstration and NIOSH's characterization of it.

DR. WADE: There is someone breathing very heavy on the telephone so I would ask you to mute or if mute's not possible to take the mouthpiece away and just listen because we're hearing from others on the phone that they're having great difficulty following. So please deal with that situation. Thank you.

DR. MAKHIJANI: On page seven of NIOSH's paper at the top there are two bullet points explaining how the presented data can be applied to the 1950s. And these are very qualitative. They don't actually present an analysis, and they don't present any references or documentation as to the assertions.

The first rationale is that the amount of enriched uranium processed increased throughout the 1950s and plateaued in the early 1960s. Therefore, the source term in

the early 1960s was higher than the source term in the 1950s. We've discussed this particular kind of rationale for estimating individual doses before in several contexts, and the main one in which this one can be applied actually to an individual dose is when you're going from a worker who would be working for a few hours or part time to full time and when work is increasing so that the number of hours of an individual's work goes from part time to full time.

But if you have ten full-time workers and then you have 50 full-time workers, it doesn't indicate that the ten full-time workers had more doses than the 50 full-time workers. Those are determined by the working conditions for those ten workers. And there are many conditions in which there are few workers but high exposures and then many workers had lower exposures and that just depends on the conditions.

And so unless there's some kind of data that indicated that enriched uranium workers, part-time work, in the 1950s, I think this particular argument doesn't appear to be

germane for individual dose reconstruction. You know, number of hours per year and so on is germane for the thorium discussion when agreed that it was part-time work in the light machining or whatever would come to that. It doesn't seem to be germane here, at least there's not data that's presented to indicate that it is applicable.

And then the second is that there were no major changes in Building 81 configuration shields, for example, shielding improvements, et cetera, that would have depressed doses the workers received in the early 1960s. So that there's the argument that, inference that you can actually assume that workers to the doses in the '50s were similar to those in the early '60s.

Now, there's no documentation or references where we can see that there were no major changes, but accepting it on face value, there are lots of instances where you can find considerable variations in working conditions from one week to the next that are documented especially in the 1950s throughout the weapons complex.

And I think in the absence of data or some kind of demonstration it's at least hard for us to accept this argument at face value that because there were no major, physical infrastructure changes that that automatically means that your doses in the 1960s would bound the doses in the 1950s.

Generally, there was a trend of declining doses from the '40s and '50s into the '60s and '70s in the weapons complex with some exceptions in particular places and times and operations but an unmistakable trend so far as my experience indicates. And so this particular rationale as a general rationale I think doesn't demonstrate that a bounding dose can be developed from the 1960s data.

So in sum we're kind of left without a substantive demonstration under 42-CFR-83 that dose reconstruction of sufficient accuracy can be done for this group of workers who were either not monitored or their badges were not read in the 1969-'70 period. Again, it's not to say that this can't be done or that suitable models can't be created or even that the existing coworker model wouldn't cover the

situation.

But none of the arguments presented, whether it's the 52 cases dose reconstructions or the specific analysis of enriched uranium and 444 operations addresses the issue substantively for the 1950s. For the foundry workers it's unclear how long that issue might go on. For enriched uranium workers I think there is a convincing demonstration for the two years for which there is data. The coworker model does envelope the available data for those workers.

Let me just stop there.

DR. ULSH: Perhaps I can respond.

MR. GRIFFON: Can I just ask one thing before we get into the details of Arjun's comments. It struck me, too, the cases, not all of them, but many of the cases it seemed to point out that the fact that they could complete those and I'm not sure. I wonder about the relevancy to what we're, the task at hand was really look at these cases.

MR. ELLIOTT: But who picked the cases? Who selected the cases? I mean, they were randomly selected.

MR. GRIFFON: Right.

MR. ELLIOTT: Why didn't we go after the foundry cases first if that's what --

DR. ULSH: I'll perhaps address that.

MR. GRIFFON: Yeah, we can address the foundry thing separately, but I'm, the point is the cases were randomly selected. We all agreed that the claimants would be the easiest population to sample from. But the question that is before the work group and the Board is can NIOSH reconstruct dose for the entire class and for all organs of interest.

Now just because you can do one, just because a case was completed, I think it's kind of irrelevant to answering that question. That's all I'm saying. Am I wrong? I mean, you seem to state that again and again. I'm not disputing whether it can or cannot be done in each case, but is it relevant to that answering our ultimate question? That's what I'm trying to get at.

DR. NETON (by Telephone): This is Jim. I think that there's fairly compelling evidence though that once we went through these cases, the whole point of the data completeness issue

is the work group wasn't convinced that they thought we were, they thought that we would have to rely more substantially on coworker models. In all these cases I think it was shown that only two relied on coworker models in general. It may have been the case that, at least in this random sample, that they aren't heavily relied on and that was the whole point of doing this data completeness evaluation.

DR. ULSH: There's another --

MR. GRIFFON: Yeah, I don't think that was the whole point. I think --

DR. NETON (by Telephone): Why were you worried about data completeness other than when they rely more heavily on a coworker model than you heretofore believed?

MR. GRIFFON: Because originally we were, that was suggested to us that the coworker model was going to be relied on for a couple cases. And then we asked that question. We got a different response later because I think -- maybe not a different response, but a more, it was examined further once the coworker models were fully --

MR. ELLIOTT: I that's been taken out of context. I think what Brant said early on, and the transcript will show that his remarks about use of coworker data were relative to the claims that had already been reconstructed. And that we knew that there were some claims ahead of us that we'd have to develop coworker datasets for. Am I correct in my understanding of that, Brant?

DR. ULSH: What I said at the time was I said at this time there are two cases that we know of that would have to rely on coworker data. This was, I don't know, some time last year, middle of last year --

MS. MUNN: Yes.

DR. ULSH: -- I don't remember when. I would have to look at the transcript to be sure, but I think I said at the time that, you know, there are still X number of claims that we have not completed, and I can't tell you what the reliance on coworker data will be there, but it looks like we are going to have to use it far less than at other sites. I said that then. I maintain it today. My decision is not --

MR. GRIFFON: Yeah, I don't want to drag this down into pulling out transcript quotes as has been done in some reports, but I might look at the Denver (Blackberry interference) report if people are interested. But I mean, we got the impression that there was going to be very little reliance, and now I agree there's probably still not a great reliance on the internal dose (unintelligible) more reliance on the external it would seem is where I think is where we're at. And I just want to move. I'm not trying to point any fingers, I just want to try to move forward.

DR. WADE: Let's deal with Mark's question. Arjun raised it and I think it's easily dealt with. I mean, there was the 52 cases were looked at, certain data gaps were identified. NIOSH has gone through a fairly complete job of identifying them. But in the body of the NIOSH report, there contains the logic that this represents proof that we can do dose reconstruction with sufficient accuracy.

I think that's not necessary to say because as Arjun points out many of the dose reconstructions are overestimates or

underestimates. It doesn't need to be said. The statement adds nothing to the debate, and I think it creates a false impression.

DR. ULSH: There were a lot of issues in Joe's comments and then Arjun's comments and the comments now. The reason that we talked about whether or not dose reconstructions were complete is because that, at the bottom, is the whole reason that we're looking at this. Is the data sufficient to do dose reconstructions of sufficient accuracy? Now, it was certainly true --

MR. GRIFFON: For the entire class for all organs of interest. I mean, that's --

DR. ULSH: Okay, so we approached this data gap question with two questions in mind. One, do gaps exist, and two, if they do exist, do they prevent us from doing dose reconstructions. We have tools that let us deal with situations where the record is less than complete, and they are the tools that you have mentioned: overestimates, underestimates, coworker data, et cetera.

So to answer the question do we have data sufficient to do dose reconstruction, you

have to look at were we able to do the dose reconstruction even if there were situations where the data was incomplete. And I have to stress that we found, by and large without one single exception, the data were complete in the first place.

Furthermore, we had sufficient data to do dose reconstruction, and that's why we made, we put that analysis in the data about whether or not we had been able to do a dose reconstruction. I mean, that's the bottom line question right there. So let's talk about, there were a lot of different issues, and I think we've talked about a couple of different groups of workers, and there's a lot of issues being conflated here that I think we need to de-convolute.

First, I think when Joe summarized the scope of SC&A's analysis, I'm in complete agreement that that was the scope of SC&A's analysis, that you all were going to look at when data was present and when it wasn't. That was the task. That's the way I remember it, the task put before SC&A for the working group.

Where I have a little heartburn is the situations that Arjun mentioned calling them inadvertent where the attachments to this report, there were in fact two spreadsheets where they concluded the data were missing. And if you want to back off of that characterization that's fine.

But my heartburn with that characterization is that that is misinterpreted by members of the public and Congressional representatives. When they hear that data is missing, then that forms the basis of bills in Congress. It forms the basis of beliefs by members of the public that there are gross problems with these records, and that is simply not true. And that is what I have real heartburn about.

DR. MAKHIJANI: Can we settle that, please?

DR. ULSH: Yes.

DR. MAKHIJANI: If you look at, we conceded that term missing was not appropriate. We said that the term missing is not used in the analysis at all, and if I'm wrong, please correct me. The term missing appears really, essentially in one table, Table 3 of

Cumulative Analysis which is only a summary. It's an error. It's inadvertent. We certainly called attention to the fact that it was an error, and it will be corrected.

But if you look at the actual compilations, Table 1, Table 2, data compilation gap 1980, gap -- I personally went through and changed all of these things where it previously said missing in the first draft. We had our discussion. You pointed this out. I know that I personally changed these things. Now, we've had a lot of things with sending them for Privacy review, you know. There has been a lot of versions of paper floating around, and I truly regret that there was one summary table and with the word missing unfortunately it appeared maybe ten times.

DR. ULSH: Twenty-four.

DR. MAKHIJANI: What?

DR. ULSH: Twenty-four on one table, 20 on the other. But I think we're --

DR. MAKHIJANI: You're looking at the wrong version of the tables. I got this off of your website, our report on your website.

DR. ULSH: Okay, well, I'm looking at the

version that when I objected to this at the January 9th working group meeting, you sent a message to Joe, and Joe forwarded it to me. It said being responsive to Brant's comments, and that was my objection to the use of the word missing. The spreadsheets that were attached, and there are two, contain the word missing 20 times on one of them and 24 on the other. And this has been picked up in public.

DR. MAKHIJANI: Well, Brant, this is not the public report because the, we really should settle this issue because, both for the process and the record, because what is public is what is on the NIOSH website. And actually, if it's different than what you have it shows that we actually went back and in good faith made the corrections.

And unfortunately, as I said, in one summary table the word missing appeared one, two, three, four, five, six, seven, eight, nine, ten, eleven times in one table, but it doesn't, and in one other place, but otherwise everywhere the word missing was replaced by the word gap in accordance with our accepting your comments. So let's not snatch defeat out

of the jaws of victory here.

MR. GRIFFON: I think we're in agreement.

DR. ULSH: I think we're in agreement. We're in agreement that it's not appropriate necessarily to conclude the data is missing so I think we can move on.

DR. MAKHIJANI: We agreed with that.

DR. ULSH: Okay, now there are a bunch of other --

DR. WADE: Let Joe speak.

MR. FITZGERALD: Yeah, Joe Fitzgerald. One other comment, too, and this process is evolving, and this was the very first draft that we provided NIOSH and the work group. And when I e-mailed that I think I even said in the transmittal that this hadn't gone through copy editing and the only purpose of providing it was to facilitate discussions at the table.

Now by the way, I'll acknowledge that these have been posted in a public way which certainly complicates things when you're dealing with the issue of first drafts. But, you know, in providing a first draft I think there's got to be an expectation and an

understanding that we would expect to have comments. In fact, the comments we're receiving from you right now on this first draft were certainly going to reflect, be reflected in the report that we're writing. So I guess keep that in mind as well that this is a process that's evolving, and it has come into a public forum the way it has worked out. But this, again, is a draft that both from the content standpoint as well as editorial content standpoint we would expect to get feedback, make corrections and that's what you do with first drafts.

MR. GRIFFON: And I think, clearly, even from last work group meeting, I think everybody is in agreement that we should call these things gaps and that statement was made.

DR. ULSH: Well, I think we can move on. If everyone's --

MS. MUNN: This is Wanda. You know, we're really getting hung up on semantics. And the semantics are not the issue really. The issue is how do other people outside of this group and outside of the technical community interpret that word; whichever word you use is

interpreted by other individuals who do not understand either the process nor the comment about source terms and where things lie.

They interpret that as being something that is not there that needs to be there; and therefore, conclude, possibly erroneously, that something cannot be done since information for some reason does not exist. Now that's, it doesn't matter what word you use, that's what comes into people's minds otherwise.

And the point that Brant made is well taken. This leads to concern by elected officials. It leads to concern by organizations that have representation for workers, and it certainly leads to concern from the workers themselves. So the word is secondary. The meaning that is transmitted is of concern when we in our attempt to be completely open in what we do stress over and over again some point like this.

What we are doing in my personal opinion is misleading both the public and the individuals who are most concerned with what we're doing. So I would urge us not to argue

about the terms so much as to be cognizant of the impact that our deliberations have.

One other point, it is disturbing to become adversarial over issues of this point. I would like you to remember that SC&A is a contractor to the Board whose charge was to point out to us major items that may have been overlooked in the process that the agencies were undertaking here. And this is not an auditing process, and this is not an adversarial process.

This is two organizations, one an agency and one a subcontractor of the Board, who are attempting to identify what truth is and what can and cannot be done with respect to the very extreme amount of information that we have on sites like Rocky Flats, and we do have a plethora of information here. So it behooves us to step back once in awhile and remember who we are, what our object is and to review for ourselves whether we are or are not playing fair with the public, with our elected officials and with the workers when we take our deliberations perhaps past the point of reason in terms of what we can and cannot do.

MR. GRIFFON: And I think that we can, I agree with the point that we can have disagreements here, but we don't need to have it so, you know, it doesn't have to get adversarial. I think we all need to sometimes step back from that and remember that. Everyone's just trying to do their job in this way.

MS. HOMOKI-TITUS: I'm sorry to interrupt. I just got another e-mail from some people on the phone saying after the burst of static now they can't, they can barely hear at all. So they want to know if we would mind hanging up and try calling back into the call-in line. Sorry.

DR. WADE: Do you want to take a quick stress break?

MR. GRIFFON: Yes, we'll take a break.

DR. WADE: We're going to take a quick break and try to re-establish the phone line. Thank you.

(Whereupon a break was taken.)

MR. GRIFFON: I think Wanda has --

MS. MUNN: One more question before we go. I was going to ask a question of Dr.

Makhijani. I wanted to ask whether there was any other category of workers other than specifically foundry workers that he has any personal reservations about coverage for to date with the efforts that have been brought before this working group.

DR. MAKHIJANI: Well, as I mentioned in my sort of follow-up to Brant, there are the Building 81 workers in the 1950s for whom there is a question about back extrapolating the data from the '60s. Generally, the gaps that we identified, Ms. Munn, were for external data for non-plutonium workers in the 1950s and to show that the existing coworker models, the new coworker models could cover them. And foundry workers seem to be the ones with, of the ones that we knew, we haven't studied all the processes that had them, seemed to have at least some potential for high exposure.

But those are the only two groups that I know of in terms of what we've looked at. Enriched uranium Building 81 workers in the 1950s and the back extrapolation involved foundry workers, the period a little unclear,

1950s and maybe somewhat into the '60s. I'm unclear because we only have one point of reference, well, two, 1968 and 1969 in terms of the data so it's a little bit harder for me to say there.

MS. MUNN: I see, so those are the only two that you have outstanding concerns about at this time that you anticipate?

DR. MAKHIJANI: Well, we --

MR. GRIFFON: I guess I would say there's other questions I have on the data completeness thing. I think the one that's most likely to present a question with regard to being bounded by the coworker approach is this foundry question. But there's certainly questions that I have still remaining in the, in some of those middle gaps, that period where even though there's some arguments made that based on the job title or the likelihood of radiation exposure, that there's no surprises in gap there.

All policies that I was aware of before this seemed to point to that they should have been on at least a quarterly monitoring program. So why not is kind of

what I'm asking. Now I don't expect that they were high exposed. So I'm expecting that you could probably use a coworker model to fill that gap if, in fact, there is a gap.

MS. MUNN: I anticipate that we'll be going there later on your agenda, but I just wanted to make very sure that there were no other real categories of individuals of potential claimants that you had any reservations about at this time.

DR. MAKHIJANI: We haven't talked about 1969 so maybe --

MS. MUNN: No, that comes later, but I --

DR. MAKHIJANI: Within the framework of this discussion, I think I, I don't know, Joe, I presented our analysis and what we've discussed in terms of where we feel the gaps are.

MR. FITZGERALD: Yeah, I think that what we've given NIOSH and what we've been talking through I think it pretty much scopes what we've identified.

DR. MAURO (by Telephone): This is John Mauro. Can I say something about the discussion I've been listening to for a

second?

MR. GRIFFON: Sure.

DR. MAURO (by Telephone): Thank you. I think we may, I know we got into deeply into some complex issues. I'd like to step back a little bit and go back to the sampling findings that NIOSH reported regarding gaps on the 52 cases. I think there's something very important that happened there, and unfortunately, I think we went by it a little too quickly.

I think originally the reason we did the sampling as I understand it there was concern that there might be gaps out there that represented missing data that might be important to fully characterize and appreciate. What I heard is that we did find gaps, but it turns out for all intents and purposes there really isn't anything that you would call, what I heard was missing data.

That is, people that if there was missing data, there's a reason why it was missing. It was completely consistent with what was going on. So it's not that there, this is part of the purpose of the

investigation as I understood it was what are the size of the gaps and what the reasons for the gaps are. And I think that the reasons have been fully explained except it sounded like in one place we did have some what you would call, I think there was one individual in one year.

I think it's important to separate that and understand that -- I think we have closure there unless the method is undisputable, what was characterized by Brant. So I think that was a very, very important finding. That is, notwithstanding the fact that there were a substantial number of gaps which Larry called on the order of about 30 percent of the records. That was the number that stuck in my mind regarding both internal and external over if we look across the whole body of data.

But it sounds to me all of those gaps, there's a reason why there was a gap there which is perfectly understandable. And I think that's important in terms of the robustness of the dataset upon which we're looking at.

Separate from that I think this is what happened in the conversation we just had. Separate from that is that now we have, we're entering really a different question. And that is when you have a gap, even though people may have deliberately not have been monitored; for example, when I heard that in the 1950s there were time periods when people were not monitored, perhaps according to today's standards you would have monitored them, but they weren't. And it was deliberately done.

That is not missing data. That is part of the gap, and it's not missing data, but it certainly represents a situation where we have people who may have been exposed, but we need to reconstruct the doses for. So I think what happened in the conversation is we left the subject of the 52 samples and what it tells us and what value it has to this program, and I think that it has served its purpose.

And now we've really left that, so I don't think there's any controversy there unless I hear differently, and now we're

moving on to the subject. But nevertheless we do have people who were not monitored. We do have places where there were zeros. Now that's separate from this question of the gaps and the reason for the gaps.

Now we're really moving into the realm of when there is, in fact, people who were not fully monitored for whatever reason, how do we go about reconstructing their doses. So all I'm trying to do right now is point out that I think those are two separate subjects. I think we very successfully addressed the first part unless there's some question regarding the, you know, NIOSH's interpretation of the fact that for all intents and purposes there is no missing data, there are gaps, and there are legitimate gaps. Gaps now that we're about to talk about that we can discuss, the extent to which there are methods in which those individual doses can, in fact, be reconstructed.

What I've just described, do you have the same sensibility regarding that? Is that what just transpired?

MR. GRIFFON: Short answer, no.

DR. MAURO (by Telephone): Okay, that's important to me because that's the reaction I --

MR. GRIFFON: I think you're ahead of me in terms of agreement with NIOSH's findings. I'm not there yet. I'm not saying that they're inaccurate. I'm just saying I'm not quite there yet, John. And part of what I was, you made a point in the middle of your statement that there were some gaps that based on today's monitoring practices wouldn't have been there.

That's not what, I think you might have been picking up on my point earlier, and I wasn't talking about on today's monitoring standards. I was talking about the monitoring practices of the time. And so I'm trying to still flush some of that out in my mind anyway. There's time periods, we've discussed a few of these fairly extensively at the last meeting, that one person that had, for all intents and purposes we saw in the site profile, I believe, and correct me if I'm wrong on the year, but I think in 1964 everyone at that point was badged except maybe

the subcontractor question which now is a clarification on that.

So I'm still trying to get my handle on the, do what's reflected in the records match up with the monitoring practices of the time period? And I was hoping that there may be some sort of spreadsheet-style analysis that backed up each one of these paragraphs rather than, because they're all sort of making different points on why a certain case, that you had data sufficient for that time period of interest. But without seeing it laid out in table format, it was a little hard to go through systematically.

But there's the one person, there's a few people actually that have this potential gap in their records in the '64-to-'75 range, and even though in most cases, and I think it's reflected in NIOSH's report, they look like low radiation potential jobs, notwithstanding that according to the policy, my understanding was that they should have still been on a quarterly badge program.

Now that might be that memo where we said in 1969 that they had a policy, at least

for some period of time, where they didn't read, they might have been badged, but they didn't read the badge for quarterly workers. And basically it was because of probably the volume of work or whatever. It was probably a cost reduction thing, and it was supported by the fact that these were lower exposure workers. I don't dispute that.

But then we see this, in some workers, this continues, and I'm not sure we've got a handle on when that starts and stops and I was looking for more of this kind of, and I know it's difficult because sometimes you just don't have the documents, but you know, a borderline test for that to say, okay, that gap makes sense because that was the policy for '69 to '72 or whatever.

DR. MAURO (by Telephone): That's what I was trying to do, Mark. I heard Brant's presentation regarding their detailed analysis of those two cases, and where we identified gaps, I think it was my understanding that there was a reason based on their investigations of why that gap existed. And I guess I did not walk away, Mark, from the

conversation that went on for quite a bit after that with the sense that I appreciated what did the sampling tell us then.

In other words, how did the sampling program and the gaps that we've identified, and then the analyses that NIOSH has done regarding those gaps and presented their findings regarding them, what does that tell us now regarding the records? How does that help us move, you know, and I guess I had a little trouble understanding the process that we're in.

MR. GRIFFON: I guess my understanding of it, and this sort of goes to Jim Neton's question earlier, too, but my understanding of what we've gotten here is basically, you know, we went down this data completeness approach more because it was apparent that there was a stronger reliance at Rocky Flats for the individual radiation files, that they had the data for the individuals.

We started looking at coworker models early on and the database data, and we came up with some questions, but we were, at least I was given the impression that for the most

part, and I'm not, again, I'm not trying to pull transcript quotes or anything like that, but for the most part there wasn't going to be a heavy reliance on these coworker models because in fact each individual had a complete radiation file, complete enough to do dose reconstruction.

So then we said, well, for the class we'll sample from this and say for the class are these records complete enough. And if not, if we find gaps that we believe are truly gaps in their records, would the coworker approach, you know, do we need to use the coworker approach to fill that gap. And if so, is the coworker approach adequate. Is it bounding and is the data in that reliable.

So sort of we got away from, you know, it's sort of this two-pronged test that if you don't use the coworker models much, we sort of stopped pursuing the question of HIS-20 versus CER and all these concerns about the data. If, in fact, we end up needing these coworker models more, then the question comes up again.

And I think we've answered, you know, I think we've got responses on both those

fronts, so I don't thing we're, at the end of today we're not going to ask for more research to be done. We just want clarifications now. But that's sort of the reason we went down this path.

And then the other question will be, and I think NIOSH is saying we've got approaches that they've used already, and they also additionally have coworker, not necessarily coworker, but some techniques, DR techniques to fill in gaps and additionally they have these other, the TIB-038 and TIB-058 coworker models.

But what I'm not completely comfortable with, and part of it's because I just haven't digested the entire scope of the report, but the question, if you look at each case sort of summary that NIOSH provided, then to me there's still some questions on the monitoring policy at the time. Whether the, if you line up the data the individual had during that time period and the monitoring policy of the time, was there that strong of a match? So I guess that's where I'm still at on the data completeness section of it.

MS. MUNN: And I'm not quite in the same place, John, for your information. But I'm a little concerned that we've kept Dr. Ulsh waiting for over 30 minutes to respond to the comments that Dr. Makhijani made earlier, and perhaps we could hold our discussion a little bit while that response came forward that might answer some of the questions for us.

MR. GRIFFON: Go ahead, Brant.

DR. ULSH: All right, some of the, okay, like I said, there were a lot of issues that were mentioned, and I think there's a lot of things that come into play here. And it's important to discuss them separately, de-convolute it.

There were a couple of, for lack of a better word, groups of workers that SC&A was concerned about. The first is foundry workers, and the second is enriched uranium workers in Building 81. There were also a couple of different time periods that were mentioned, the '50s and 1969 and '70. And those were, all four of those factors there are completely different. They're separate.

So let me just start first of all with

the foundry workers in the '50s. I don't know that SC&A said this explicitly, but you seem to be under the impression that foundry workers in the '50s were not monitored. Am I misstating your --

DR. MAKHIJANI: No, yes, you are. We haven't, all we've said is that the data completeness findings were that the non-plutonium workers had the gaps in external dose in the 1950s. That's where the gaps were concentrated.

DR. ULSH: Okay.

DR. MAKHIJANI: So there would be uranium workers, everybody was outside the 700 series buildings. Now the foundry worker question, we did not actually look for foundry worker data, just for the record, because of what Larry Elliott brought up. You know, why didn't we look at foundry workers was the concerns. The non-plutonium workers became a concern because of the analysis of the random cases. We didn't know beforehand what we were going to find, and the foundry workers became a concern because in that context there was also the document from *, that said

that this was a place of particular concern.

Now we haven't found any data for the 1950s for foundry workers nor have we looked through to try to identify a database. We were looking to you to show some foundry worker data for the '50s for whoever was there because we understood that you might do that and that they would be monitored because of their higher exposure potential, something like that. We didn't find any.

DR. ULSH: Well, in fact, that's exactly right. I'm going to circulate some more Privacy Act material. Please get this back to me if you're not going to take it home.

In a discussion that SC&A and NIOSH had, your interview with Roger Falk, we discussed that the enriched uranium workers in Building 81 were not monitored until the fourth quarter of 1960, and that's true. We're in agreement there. They weren't.

That's not the foundry workers though. The material that I'm handing around right now is dosimetry, just an example of dosimetry results for foundry workers in 1953. In fact, the foundry workers, as you stated, Arjun,

because they had a higher exposure potential relative to other uranium workers were, in fact, monitored. They are not unmonitored workers.

Coworker data is not a question for these people in general. Now, I don't want to swear that there's not a single unmonitored foundry worker, but in general, the group that includes foundry workers were monitored. So I think that the urgency in terms of applicability of coworker data to foundry workers in particular is not really appropriate because they were, in fact, monitored and here's an example of that.

Now, you're right, Arjun, that the 52 workers that we looked at for data completeness, I'm not aware of any foundry workers in that 52, in that group of 52. So your caution about making any conclusions about that is justified because there weren't any in that 52. But this group of workers was monitored in the '50s.

DR. WADE: How do we know if we're looking at foundry workers?

DR. ULSH: If you look at the top corner, it

says Building 44, and then we've gone and that's the uranium, that's the DU foundry that we're talking about here.

This group includes not only the foundry workers, but I think there's also management types in here as well. But this is the Building 44 workers for this particular badge exchange cycle.

DR. MAKHIJANI: And we would be able to go back to the documents and see that there are many foundry workers in here. This is the first time I'm seeing a record of foundry workers.

DR. ULSH: I know. I got this because of the question that came up. What you would have to do, Arjun, to make that determination is make sure that you're looking at Building 44 because that's where the foundry was. And then beyond that you have to look at the job exposure history cards and look for terms like, I think, operator or, I don't know, there might be a couple of other titles. But that would indicate to you that if they were an operator in Building 44, there's a good chance they were doing a foundry-type

operation.

DR. MAKHIJANI: Were there only foundry operations at 44 or other operations, too? That's what I'm not clear about.

DR. ULSH: Building 44 was in large part, I mean, it was a metallurgical operation for handling DU, and it's a little too bright a line to say foundry workers versus non-foundry. I mean, they weren't, I don't think that they were split up that way. They were doing operations, not chemical operations, but typical types of metallurgical operations that occur in a DU metal-type operations. So if you --

MR. GRIFFON: You said you'll see management types on this list as well?

DR. ULSH: I think that this includes, well, I don't want to say all building for those pages I've given you. I don't want to say all Building 44 workers although I think that that's true for this badge exchange cycle. And that will include foundry workers as well as the salaried, management-type.

MR. GRIFFON: So someone made a judgment that anybody in that, based on that premise

you're saying anybody could have received greater than ten percent of the RPG because that was the practice at the time, right?

MS. MUNN: If you're relying on the assumption that the major source term is there, yes.

MR. GRIFFON: Often time we've said managers, you know, we look at job titles and make decisions based on that so if we've got management and salaried people --

DR. ULSH: I think, Mark, though that judgment was not necessarily made on a per individual basis. I mean, this group of workers included people who had the potential to get greater than ten percent; therefore, they monitored the group.

MR. GRIFFON: I'm just trying to understand --

DR. ULSH: I understand. That's a good thing to be clear on.

DR. MAKHIJANI: Brant, what's the indicated badge cycle here and the units, are they in roentgens or looks like that, but I'm not sure if it is --

DR. ULSH: It does look like that, Arjun.

DR. MAKHIJANI: It's not indicated.

DR. ULSH: I don't know. I'd have to go back and investigate that in terms of what the units are.

UNIDENTIFIED: It will give you an issue and return date.

MS. MUNN: It looks like --

DR. ULSH: Yeah, in terms of the radiation I would have to check that out.

DR. MAKHIJANI: But it's a monthly cycle?

DR. ULSH: It is a monthly cycle.

DR. ULSH: Okay, so that's the foundry workers. Now that's the foundry workers in the '50s. We need to keep that distinct from '69 and '70. That's a separate situation, and we'll talk about that separately.

Now in terms of the Building 81 enriched uranium workers, we know that they were not monitored until the fourth quarter of 1960 as our report discusses. And we're in agreement with SC&A that they were not monitored. The question is why weren't they monitored. Well, the reason is because with the badging policies in place at the time, those who were not expected to exceed ten

percent of the tolerance limit, it wasn't required that they be monitored.

And if you look at once they were monitored in the fourth quarter of 1960 and in 1961, that judgment appears to be justified because they were lower than the tolerance limit. But of course, the question as Arjun has pointed out, the question remains can you go back in time, extrapolate back into the '50s. And I think that's a valid question.

The things that would give me pause about extrapolating back in time would be if there were the source term was different or if there were exposure conditions that might have been different, for instance, improved shielding or whatever. And that's why I put those two bullets that Arjun referenced into this report because if you look at the material balance and account ledgers, which for enriched uranium, are classified.

But SC&A has people who have clearances, and if you want to verify this, you can do that. But those account ledgers show that the amount of enriched uranium that was processed at Rocky Flats throughout the

'50s steadily increased up to a plateau in the early 1960s. And in some time in the middle '60s -- I can't remember if it was '63 or '65 -- all of those operations, enriched uranium operations, were transferred to Y-12.

So what you see in terms of the source term present is that the amount that was present that was being handled in the '60s was higher or equal to the amount that was being processed throughout the '50s because of that steady ramp up throughout the '50s.

And also you don't see major building configuration changes. For instance, I mean, in other buildings, I think in particular around the americium line, there were projects to increase shielding. They observed high exposures, and they increased the shielding. Well, obviously, if you had enriched uranium operations in the '50s and then in 1957 you said, wow, we need more shielding, and you put it in, and the people aren't monitored, and you don't have monitoring results until the '60s, well, that would give you some pause about extrapolating backwards.

We don't see that situation for

Building 81; and therefore, that gave us some comfort that the, what we're seeing in 1960 and '61 would be applicable back into the '50s. The judgments of the health physicists in place at the time that these workers were likely to have exposure potentials lower than ten percent seems to be justified.

And furthermore, then the question becomes, well, all right, if they were not monitored in the '50s, and we know they weren't, what are you going to do? Well, one thing that we might do is apply coworker models. And if you look at OTIB-58, and you look at the values of the coworker models that we are proposing for the 1950s and into the 1960s, in no case does the exposures that you see in this group of workers, these enriched uranium workers once they were monitored, does it even approach, does it even remotely approach the amount of dose that we're going to apply under coworker if we choose to use coworker data. That's not always necessary. So that was the genesis of that discussion in our report.

Now, Mark, you also asked the question

about badging policies at the site over time, and if you recall, it was our, I think in our TBD, and it was our original assumption that a particular quote about in 1964 -- this is from memoirs -- in 1964 we were able to incorporate the dosimetry badge with the security badge. This was an improvement from the standpoint of assuring that employees was (sic) wearing a badge while working on the job.

We originally interpreted that to mean that beginning in 1964 everybody was monitored. And you recall that that caused some confusion when SC&A presented the results of the analysis of the first 12 workers in the data completeness because, well, if everyone was monitored, then why do we have this one particular individual who wasn't? And so we went back and took another look, and it turns out that we actually misinterpreted that comment to mean that everyone was monitored onsite.

Throughout the '50s there was the rule about greater than ten percent of the tolerance limit. We know that. It is true that in 1964 they expanded the monitored

population, and that was facilitated by the combination of the security badge. But it appears that even at that time that there were people who had low exposure potential who were not monitored.

And you can see that from the graph that we put out, and I think it might even be in one of SC&A's reports reproduced where it shows that there is less than 100 percent in all years at Rocky Flats. We know that. We know that that is the case. Now periodically they expanded the monitored population, but at no time does it appear that they had a policy to monitor everyone who ever set foot on the site. It appears that there were always some exclusions for people who had no significant exposure potential.

And if you look at our write up on the badging of personnel at Rocky Flats, and the one that I have is dated November 30th, 2006, but I'm not sure if this is a draft or when exactly we sent it over to SC&A and the working group. That gives some information on this periodic expansions, different groups being monitored, being added to the monitored

population. So, Mark, as you digest this, our report on data completeness, that might be a helpful thing to look at in terms of determining what the badging policies were at the time.

So it's certainly true that in our original TBD we made an incorrect assumption that beginning in '64 everyone was monitored. That does not appear to be the case, and we will be revising the TBD to handle that if we haven't already. I don't know.

MR. MEYER: We haven't yet.

DR. ULSH: Okay, so that's in the works.

Let's see, I think, okay, so my main points here that's it's important to keep the foundry workers separate from the enriched uranium workers, to consider them separately because their situations were different in the '50s. The foundry workers were monitored. The Building 81 EU people, EU workers, were not until 1960, fourth quarter.

Now that brings us up to 1969 and '70, but, Mark, I don't know if there's more that you want to discuss on this before we get into '69 and '70 or if you're ready to jump into

that?

1969 DATA GAP

MR. GRIFFON: I think it's probably okay.

DR. ULSH: Go ahead?

MR. GRIFFON: Arjun or Joe?

MR. FITZGERALD: That's fine.

DR. MAKHIJANI: That's fine.

DR. ULSH: All right, 1969 and '70 was a strange time at Rocky Flats. They had the, the big event was the Mother's Day fire that occurred in May of 1969. That was a very disruptive event. It occurred in Building 771, I think, 776. And it essentially stopped plutonium production operations for a time.

Now, concurrently -- this happened in the first quarter of 1969 -- there was a policy, administrative policy, that workers who were stationed outside of plutonium areas and were on quarterly badge exchange cycles, their badges would not be read unless the circumstances warranted it. That was administrative policy.

And the motivation behind that was that they were preparing to switch over to TLDs. There was a lot of manpower, a lot of

resources, being dedicated to reading these film badges for workers who were at low exposure potential. And when I say low exposure potential, I'm drawing that from the fact that they were on quarterly badge exchange cycles which is the longest badge exchange cycle.

And they made those determinations about which cycle you were on based on your exposure potential. So those workers, their badges were not read, and that has caused a lot of consternation around the tables and me included.

The way that this was originally discovered, I think SC&A noticed that the frequency of zero badge readings increased suddenly in 1969 and went on into '70. And so as we investigated this, you know, you'll find the history of our investigative efforts on this issue in particular in our report and also in SC&A's report. We originally, when presented with this increased incidence of zeros, we considered a lot of different hypotheses. We put everything on the table just to try to find out what the reason might

be.

The hypothesis that we started with was something related to the fire. Well, that relatively quickly became evident that that didn't explain the situation. And then we happened upon this report. It was a monthly progress report from the dosimetry section that set out this policy to not read the badges for these particular workers.

And so then we started evaluating the patterns that we see in external dosimetry in '69 and '70 against that policy. And what we found is that it's consistent. It is consistent with that policy. And we actually saw film worksheets for people that were affected by this policy where there's a zero at the top of the page and then an arrow all the way down the page covering a number of different employees.

And the problem came in with the treatment of those zeros. Those zeros were interpreted as real zeros when in fact they should have been interpreted as unmonitored people. If you're wearing a badge, but the badge isn't read then you're not monitored.

And so the question comes up, well, what do you do with that then because in the data that we use for coworker distributions, HIS-20, those zeros were treated as if they were zeros. And that's a problem.

It doesn't indicate anything nefarious, you know, they were out to deceive anybody, but it's a problem in terms of coworker distributions. And so the question then becomes, well, what do you do. What impact does this have on our coworker distributions for 1969 and '70.

And another question that we have been wrestling with is when did this policy end. And, Mark, I would still love to be able to hand you a memo that says as of X date, this policy's rescinded. We have not found that, and I don't think we're going to find that. Therefore, you have to look at the weight of the evidence.

Bob, are you --

MR. MEYER: I was just going to say we've put an awful lot of effort into trying to find that memo, and it doesn't seem to exist.

DR. ULSH: So let's look at the weight of

the evidence. Consider that the reasons behind, the motivation behind this policy was the resources that were being expended to read film badges for people who were at very low exposure potential, at least putatively judged to be at low exposure potential. That motivation goes away with the transition at the site to TLDs, and that happened, 1969 and '70 were transition years, and by the end of 1970 everybody was on TLDs.

Also, as pointed out by SC&A, the incidence of zeros, those years where you see the high incidence of zeros was limited to 1969 and '70. And so from the weight of the evidence it appears that this policy was in effect done away with, no longer applied, by the beginning of 1971. It would be an issue in 1969 and '70.

MR. GRIFFON: Can I just add, when you said in '71 everyone was on TLDs, you meant 100 percent of workers.

DR. ULSH: Thank you, Mark, 100 percent of the people who were monitored, were monitored with TLDs. That's correct. I'm not saying that everyone on site was wearing a TLD.

I don't know, Craig, am I missing anything in terms of the weight of the evidence?

DR. LITTLE: Well, the, we know the TLDs were phased in through time. They didn't all hit at the same time, and in the report we've got about six or seven monthly progress reports that make statements about when things were, when TLDs were phased in at the various buildings, into 771 in September of '69, and in 76 it was February of 1970 that, the December 1970 progress report which is written in January '71, says all film badges have now been replaced with TLD badges.

We also know that people went in in the immediate aftermath of the 1969 fire were wearing TLDs. They were wearing TLD badges because we have a summation of external exposures to people who were in that fire during the period through May, June and July of 1969. The maximum external dose to any single person who was attending to that situation was under 200 millirem with the vast majority under 50 millirem. Only three people received over 150 millirem.

So we know that they did use TLDs. They had some on site. They did use them. They didn't have enough to start using them through the whole plant and didn't make that conversion until the end of 1970. And they staged in as you would expect with the higher exposed people getting the TLDs first, then the lower exposed people getting TLDs later.

DR. ULSH: And that actually is a good segue, Craig, thank you.

One of the concerns that SC&A has raised about this non-read policy, it applied to people who were stationed, officially stationed, outside of plutonium areas. However, SC&A presented a couple of individuals, one of whom went into Building 776 after the fire occurred, and there is no external monitoring data in his file. So it makes you wonder. Well, I think it makes you wonder, why not?

And what Craig has said is that the people who went into the building after the fire were wearing TLDs. So let me clarify what that means. We talked to several individuals, several people who were directly

involved in the fire including the fireman who was in charge of the response. And they all -- okay, without it in front of me I don't want to say all. Many of them said, those who commented on whether or not they were wearing dosimetry say, yes, we were badged with TLDs.

And if you look at the memo that is included in our report, it talks about personnel TLD dosimetry data. These were special TLDs. They were not the dose of record. They were not issued to you as your routine film badge. They were issued on a job-specific basis as special dosimetry is by the supervisors in charge they would hand out to the workers that were on this particular job.

These are not the dose of record, and that's why it is not inconsistent when people say everyone who went into the building was wearing a TLD, but we don't see TLDs on a couple of individuals that we know went into that building. It's because they're talking about special dosimetry. It's not their routine film badge.

And furthermore, the concern was

raised then if there was someone going in who was not monitored, and we've just talked about the fact that they were indeed monitored, but they were in Building 776, had high exposure potential after the fire. Well, I want to talk about that second premise as well. You cannot assume that someone who went into Building 776 in the aftermath of the fire was at a high exposure potential.

In fact, we know that that is not the case because if you look at the memo that's included in our report, dated July 24th, 1969, as Craig mentioned, there are 173 people who received between zero and 50 millirem, 28 people who received between 51 and 100, four who received between 100 and 150 and three who received between 150 and 200. And over the time period, 5/11/69, that's the date of the fire, through 7/22/69, July 22nd, 1969. So the premise that these people were at high exposure potential is not supported by the monitoring data that we have.

MR. FITZGERALD: And is that -- excuse me, Brant -- is that reflecting a consideration of Super-S?

DR. ULSH: No, Joe, this is external.

MR. FITZGERALD: You're saying it's external.

DR. ULSH: This is external. That's correct.

There's certainly the potential for intake of plutonium, and certainly high fired plutonium because it was a major fire involving plutonium, and that's one of the ways you get it. So this says nothing about potential exposures of Super-S.

Now the issue that your question raises is how, okay, we've talked about external dosimetry potential, but what about internal doses? And for that situation we would certainly apply Super-S if it's claimant favorable to do so for a person who went into the building after the fire, absolutely.

DR. LITTLE: But there was monitoring data for a number of the people that went into the building. They have chest counts.

DR. ULSH: That's correct.

DR. LITTLE: And only one of the people that was, and I think there were 45 people if I remember right, who were given chest counts in

a very short term after the fire. Only one of them had a significant lung count, and that was a person who was indeed a fireman who had somehow gotten, who went up on the, he could not understand how he got it.

He surmised that he might have gotten it because he went up on the roof, and that's the one place he thought he might have gotten an extra long exposure. But none of the other people, including some of the people who were raised up in some of these reports, have internal lung counts that are significant, above that.

DR. ULSH: So what we're left with is there is no evidence that the judgment that the people whose badges were not read were at high exposure potential. It is true that on occasion they might have gone into a building like 776 but not on a routine basis.

And when they were going into a situation where there might be an exposure potential, the examples that we have, for instance the aftermath of the fire at 776, they were monitored through special TLDs. Now I don't want to say anything beyond that,

beyond the examples that we have, but we don't see evidence that in fact these people had high exposure potential, and they were not monitored.

Now what about the foundry workers, our old friends the foundry workers. I'm going to rely on Craig a little bit to summarize what data does exist for the foundry workers in '69 and '70. But one thing, the standard that I would like you to compare it to is the coworker dose that we would assign in 1969 and '70.

And if I can come up with that -- the current version of OTIB-58 assigns for 1969 at the 95th percentile. Keep in mind we're talking about people who would have worked in radiation areas so we would assign the 95th percentile. What you see for penetrating doses, OTIB-58 assigns 2.47 rem, 2,472 millirem, for 1970, 2,071 millirem.

For non-penetrating doses, this is shallow doses, we assigned 2,574 millirem in 1969, and in 1970, 2,115 millirem. There is absolutely no indication that the foundry workers ever approached those dose levels. So

it is, we maintain that the coworker dose that we would assign in this situation if you have an unmonitored foundry worker is very, very claimant favorable.

Is there anything else to add?

DR. LITTLE: Well, the only thing I would add is if you look at the table that is on the report that Arjun commented on earlier, we were able to find for foundry workers in '68 and '69, we found film badge worksheets for '68 that had data for most of those people for most of the quarters. I mean, there were a few that were not, they had blanks because they didn't return the badge or in a few instances they just had zeros.

And then in keeping with that policy that we talked about of not reading workers' badges who were not expected to be significantly exposed, we found in the first three quarters of 1969 zeros for everyone except one of these guys. And we, this is, I don't want to leave people with the false impression that we think we know who all the foundry workers were in '68 and '69. We don't I don't think, but we have identified some

here that we are sure of.

And our intent with these people was to, our intent in total was to try to find the memo or find the period of time when this policy went away if you will. And so we said, well, let's find some of these guys, so we found '68. We found they had data. We followed them in '69. They didn't have data in the first recordings, but all but one of them have data in the fourth quarter which is an interesting situation.

We couldn't follow all of them into the '70s, into 1970, because what happened is a lot of these guys changed, they either changed department numbers, that is, the department number got changed. And that's how you identify who's who. You know, on the supervisors' reports they're by department number, and then you can backtrack to the lab worksheet or the supervisory report.

Or they actually changed jobs. They went into another, so it's hard to, it's a much more difficult task than you might think to go find somebody and track them back through time to find out where they were or

find them now and track them forward in time because they moved to another department number or numbered building, something like that.

But one point I'd make about this table is they're all zeros in the first three quarters for virtually all these foundry workers but in the fourth quarter there's data. We're not making the assumption that that data represents the, a cumulative for the year. We're not making that presumption. It's possible that that's true, but we are saying this is in keeping with that policy that says we'll read it if we think there's, if we think they're going to get a significant exposure.

So they didn't do anything that was considered to be a, maybe they didn't even operate the foundry in the first three quarters. I have no clue, but there are zeros there. Then all of a sudden the fourth quarter these people all show up with data. Something happened to make them read the badge, plain and simple.

DR. ULSH: And keep in mind the original

policy said the badges for these workers will not be read unless circumstances warrant. So if circumstances warranted, their badges were read. But that's what the policy says anyway.

DR. LITTLE: Right. So also, the numbers shown in the fourth quarter there, only one of the numbers in there, one of the workers, that is, has numbers that approach the values that Brant was just reading.

MS. MUNN: What were those numbers like, Craig? Just a few.

DR. LITTLE: External range from a low of 42 millirem to a high of 280 millirem.

MS. MUNN: Okay, thank you.

DR. LITTLE: Skin doses range from a low of 65 to a high of 3,460, but that one person was pretty much an anomaly in this group. Everybody else was in the 400s, 500s. There was one 740. But remember that the tolerance dose for a quarter was 1,000 millirem, or ten percent of the tolerance dose, I'm sorry. The tolerance dose was ten rem for skin in 1969.

MR. FITZGERALD: And just to clarify back again, Brant, you were indicating that OTIB-58 if applied would be well above, I think you

mentioned, 2,000 as opposed to four or five hundred at the 95th percentile which would be the presumption for these workers working in a rad area.

DR. ULSH: Yes.

MR. FITZGERALD: So that would be the likelihood, likely application.

DR. ULSH: Yes.

DR. MAKHIJANI: The 2,000 would be for the whole year for shallow or deep?

DR. ULSH: Arjun, the numbers for penetrating '69, in 1969, 2,472 millirem, in 1970, 2,071 millirem. Now non-penetrating, shallow dose, for the 95th percentile in 1969, 2,574, and in 1970, 2,115.

DR. MAKHIJANI: So the non-penetrating actually doesn't cover even one quarter of one of these workers, right? The fourth quarter for this one worker is 3,460.

MR. MEYER: That's the normal statistics you expect to see.

DR. MAKHIJANI: There are only six workers, and actually if you do, compare it to log normal for these six, you get a 95 percentile that's more than the highest reading, so,

because there are only six workers. And so the, actually, one of my comments was that in my notes, was that this application actually shows that even with six workers you've got an exception in terms of coworker model.

DR. ULSH: Well, keep in mind, Arjun, that they said, the policy said that badges would not be read unless circumstances warranted. That would indicate that if they followed that policy accurately, then the people who had high exposures would be monitored. You would not be applying coworker data to them.

DR. MAKHIJANI: Well, you know, it's a little bit of a problem technically in my view because you're trying to, you know, so it's a little bit of a circular argument in the sense that if there's data, you assume that somehow it was determined that there was high exposure potential so they were read. And you're now assuming that everybody who was somehow thought to be exposed, their badges were read, and that was then comprehensive so nobody will slip through your net.

But because in your coworker model you're not covering all of the people who were

at high exposure potential just from this list of six for whom we have data. So it's a little bit of a problem because you're trying to go back and say that they were, they knew pretty well when to read these badges and when not to read the badges when there are a thousand badges per quarter that they weren't reading.

DR. LITTLE: A thousand badges for the year. They estimate in that --

DR. MAKHIJANI: A thousand badges per year?

DR. LITTLE: Yeah, a thousand packets is what they expected they would save by that '69 policy of not reading badges. If they did that it'd be 250 people.

DR. MAKHIJANI: It's still a sizable number to go back, and I have not seen, you know, you all have made a better, certainly more thorough evaluation of the records and are more familiar with them. There was a policy, and I have seen those exceptions that we'll read there are exceptional circumstances, but I didn't see any guidance for the implementation of that policy. How did they determine when an exceptional circumstance

happened that they got alerted and actually went and read the badge?

DR. LITTLE: Well, let's just make a premise here with these six people who are zeros. One of these people is a supervisor. He's the supervisor of these people. He knows whether they're running the foundry, to make an extreme example. He knows we're not running the foundry for three quarters or we're running it on a very limited basis or whatever.

He says under the policy I don't have to read the badges. I don't have to turn them in. Or I turn them in and I tell them we haven't done anything. They don't need to be read. If, on the other hand, I mean, he's the hands-on guy with these people. He knows what they're operating. He says it's time, we need to read these badges now.

I mean, in an operational sense I don't think there's a whole heck of a lot of mystery about whether somebody may or may not be exposed depending on the situation. If you're, if that's your job, and you work in that environment all the time, you're going to

know if there's some possibility of doing something that's off normal, if you will, from what you normally do.

And look at their '68 doses. They --

DR. ULSH: And is it possible that a supervisor in that situation, or whoever's making the decision about whether a badge should be read, could make a mistake. Absolutely, it's possible, not very likely because you're working with this process every day. But can you make a mistake? Sure, you can. That's why we use the 95th percentile to cover instances like that.

DR. MAKHIJANI: But when did the policy change from monthly to quarterly for foundry workers? In the '50s, the sheet that you handed out indicates monthly and now your foundry workers are quarterly.

DR. ULSH: I think in 1953, Arjun, from the example that I've shown here, they were on monthly. But they very quickly changed to more frequent than that. I don't want to give you an exact --

DR. MAKHIJANI: More frequently.

MR. ELLIOTT: That's less than a month?

DR. ULSH: I think so, but I would have to double check that. So don't take that to the bank. I would have to look at the actual records. But I think that they very quickly, once they started monitoring them, they started on a monthly cycle, and they saw what kind of doses they were receiving. And I think they went to a more frequent badge exchange, but I'll check on that.

DR. LITTLE: I could say that in '69, it might have been '68, we found some of these same people with biweekly badges, a few, just a very few biweekly badges. And those are interspersed in with the, in the lab worksheets. And there's no particular pattern, but that again is a situation where on a process knowledge basis, the supervisor may have said, okay, we need to pay closer attention during this period of time or something.

MR. ELLIOTT: Was that found only in Building 44?

DR. LITTLE: Well, it was just specific to this group and this table. I just happened, I mean, frankly, we're, we were screaming

through these data, but I was tracking it by building number. And the way the lab sheets are organized by building number and by period, period being a code two is a biweekly, a code four is a quarterly, a code three is a monthly. And so you go through these things and you look for various buildings. And I happened to run across a 44, a Building 44 period two and some of these guys were on there. And I didn't have time to investigate that.

MR. ELLIOTT: And the biweekly results produced a dose above the LOD? You didn't look that close.

DR. LITTLE: I didn't look at that. I didn't, no.

MR. SMITH (by Telephone): Brant, this is Matt Smith.

DR. ULSH: Yes, Matt.

MR. SMITH (by Telephone): One thing I had on the numbers that you quoted, we would use those numbers and their base line coming into the OTIB-58 process, and then on top of that I believe was also add missed dose. The way would do that for those years is we would

apply 23 cycles of a missed dose based on the fact that would be the highest possible exchange frequency for those kinds of data.

DR. ULSH: Matt, I thought, I think I pulled these numbers out of Table 71 in OTIB-58. I don't have that in front of me. But if I did pull it from OTIB-58 from Table 71, I think that includes missed dose but double check that, please.

But at any rate this is at least, I mean the numbers I gave you are the minimum or the actual numbers. We might be adding missed dose on top of that.

DR. MAKHIJANI: Could we request some of the data that you, Craig, that you looked at so we can kind of go back and look at a little bit of it in this final stretch? That would be helpful.

DR. LITTLE: You want the laboratory worksheets?

DR. MAKHIJANI: Or tell us where they are, you know, where they are in these --

MR. GRIFFON: When you say laboratory worksheets, are you talking job history worksheets or a different worksheet?

DR. LITTLE: These are worksheets, the handwritten laboratory worksheet.

DR. MAKHIJANI: Are they in the site research database somewhere? If you can just send me an e-mail with the site research database.

DR. LITTLE: They're all available on the O drive. I know that.

DR. MAKHIJANI: I'll try to find it myself.

MR. ELLIOTT: Let's hold it in for you.

DR. ULSH: All right, I've got a member of the team looking in the Building 44 DU workers put on a weekly exchange frequency starting in May of 1954.

DR. MAKHIJANI: Weekly?

DR. ULSH: Yes.

DR. MAKHIJANI: And were there any non-zero doses then?

DR. ULSH: I didn't ask that. There might have been.

MR. GRIFFON: Listening to what you said, I think the foundry worker might be a good case example if we can find in our fourth item on the agenda some samples. Because I think you said that that, that you may apply the

coworker model depending. And I think a real example of a foundry dose reconstruction might be a good thing to look at in the final stretch.

DR. ULSH: Mark, I can commit to trying, but I do want to caution --

MR. GRIFFON: You may not have one.

DR. ULSH: Exactly, because first of all the number of claimants that had employment -- now wait a minute. Are we talking about '69 and '70? We are, right?

MR. ELLIOTT: We're talking about '50s.

DR. ULSH: Okay, the number of Rocky Flats claimants with employment in the '50s is not great. And keep in mind that in terms of coworker dose, coworker dose reconstructions, that came late. So a majority of the dose reconstructions that we've completed were done without coworker data. And then I can't think of an obvious way to say this person is a foundry worker without just going in and looking manually. So I will try, but I can't commit that I can actually find one that meets all those criteria.

DR. MAKHIJANI: Mark, do you think that in

the absence of that, looking through some of these datasheets and maybe tracking a couple of individual workers would be helpful? It seems it would be helpful to try to resolve. If Brant can't find an actual dose reconstruction example in that area, it might be helpful.

We can just go through that since, you know, this is the first time we've actually found, you know, it seems like a fairly extensive data, and they have weekly data and so on which indicates that they weren't in that three month swap where we tended to find the gaps.

DR. ULSH: I think, Arjun -- and I don't want to put words into your mouth -- I think the places where you found gaps corresponded largely to Building 881, but I don't know if you're -- Is that your recollection?

DR. MAKHIJANI: I just want to -- no, I don't remember actually. I'd have to go back to the table and look, but there was more of a Plant B. Would that be 881?

DR. ULSH: Plant B is Building 881.

DR. MAKHIJANI: Right, so if I recall, it

was more of a Plant B in the sample of gaps, yes.

MR. GRIFFON: Well, I guess the datasheets that you're talking about, Craig, are these, what datasheets are we talking about that are on the O drive that you, they're not from individual radiation files?

DR. LITTLE: No, they're laboratory worksheets.

MR. GRIFFON: Laboratory worksheets, that's what I'm looking for.

DR. LITTLE: And they are, that's what they were. They're film badge worksheets.

DR. ULSH: For the '50s.

DR. LITTLE: No, I'm talking '68, '69.

DR. ULSH: That's what you're interested in '68, '70?

MR. GRIFFON: That's why I'm clarifying.

DR. LITTLE: He wanted '68 and '69, Arjun did.

DR. MAKHIJANI: What was Bob looking at just now for in terms of Building 44 in the '50s for the weekly --

DR. ULSH: That is the example that I passed around. The example that I passed around.

That's one example. And those are in the site research database, but we'll point you to it.

MR. GRIFFON: So you can put those all in one spot, and I guess consider those in your file. That's what I would say, right?

DR. ULSH: That's for the '50s.

DR. MAKHIJANI: That would be there then.

MR. GRIFFON: Can I --

DR. ULSH: Yeah, I'm done. I'm done. Go ahead.

MR. GRIFFON: I think we're almost ready to break for lunch, but I had, just with these case write-ups. I think I -- or Joe, I saw your e-mail trail on this with the question of supporting data to back this up. And maybe I can just explain why I'm asking this. This is just one example that I happened to grab here.

It's the job title's a photographer worked in a cold area, and 15 years all he got one gram total exposure, and then it says file consistent with monitoring policies at the time. What I don't understand is if I look at SC&A's, a review of SC&A's findings they say missing '58 through '61, comma, '63, comma, '69. And then there's a lengthy comment about

the '69 zeros versus blanks. I don't know if you went through this in a way that we said, okay, here we had this guy.

We, first of all, I'm not sure he was a for the entire time period, and if he was, and he worked in a cold area, why would he be badged some years and not others? Was he going in, I just don't get it. If I saw a clean sheet, and it said no monitoring, then I could take your argument of worked in a cold area, a , no data. I don't expect any, but he has some and then he has missing periods. That's what doesn't make sense.

DR. ULSH: This is a good example, Mark. Let me tell you how I approached it. How I and the other team members approached this particular one. I knew this guy well. Let me rephrase that. I'm very familiar with this guy. This is the who went into Building 776 after the fire, right? Yes, and it was one of the ones SC&A was concerned about because he was subject to that policy of non-reading in 1969. And that's why you see a period with no monitoring data in '69. Now

what about the other years there where he doesn't have data? The way that we approached this was we went to NOCTS and pulled out this particular claimant's job exposure, job history card. It's listed as personnel exposure, and that's where we determined where he was stationed and what his job duties were. He was a at --

MR. GRIFFON: But he didn't lay this out is my guess. I mean, if I was poking through this I might lay it out. Here's his years of work. Here's his data. Here's his jobs over time. This is why we see these gaps.

DR. ULSH: I didn't reproduce his job history card in this response. I was looking at it when I was looking at the years in SC&A's table where there was no monitoring data, and I said, a-ha, in this year he was a in whatever building. So I mean I had that data available in front of me, and I went through and addressed, well, we went through and addressed, considered each of those years where he didn't have data and what was he doing at that time. That's how we approached --

MR. GRIFFON: So it may be that he had a different job in the interim or something like that. I guess that's what I'm trying --

DR. LITTLE: I don't think, in this particular case I don't believe so.

DR. ULSH: I think he was a .

MR. ELLIOTT: He might have been assigned to go take at a rad area where he --

MS. MUNN: This has certainly been the case on other sites. I know several who, generally speaking, have no need to be monitored.

MR. GRIFFON: I don't dispute those, I mean, those are obvious general statements anybody can make. That's clear. I'm just asking --

DR. ULSH: Mark, if you wanted --

MR. GRIFFON: -- if I wanted a detailed review, how do I, you know, a , how do you, how can you make, but how do you determine for those years that were missing he was working in cold areas, but then for those years that he had data, you know, all of a sudden, I mean I guess it's just basically are you saying they made the right decision or is there more there that indicates that he was,

you know.

DR. ULSH: Here's how you can get more information on this. If you've got the NIOSH ID there -- and don't repeat it because I think that's Privacy Act, but we can go on NOCTS and --

MR. GRIFFON: No, I have the job history cards. --

DR. ULSH: Oh, you do.

MR. GRIFFON: I'm just wondering if in your putting together this, that you had a spreadsheet built then I wouldn't have to. I'm hoping that you saved me a step and I could look at your analysis files of how --

DR. ULSH: There is no spreadsheet.

MR. GRIFFON: You just went right from the hard copy PDFs to this report.

DR. ULSH: Exactly. There's no Excel spreadsheet. There's a spreadsheet in my head when I did this, when I laid the job exposure card versus the table that SC&A constructed that showed which years he didn't have data. I took those and laid them side by side and said what is the explanation if there is one for all these years that he didn't have data.

And also, something else that indicates that he was at low exposure potential is that for the years that he was monitored, his doses were very low. So I mean you would have to make the assumption that for some reason they monitored him in the low exposure years but didn't monitor him in the high exposure years, and I don't think there's any evidence for that, and that would be an assumption that wouldn't be intuitive to make. But that's how we approached each of these cases.

MR. GRIFFON: Yeah, I'm just trying to understand from a policy standpoint how someone would take that kind of person on or off of a badge program. It seems like he might be doing various things around the plant all the time, and how they determined in one year he was just taking pictures in cold areas.

MR. ELLIOTT: Wouldn't you have to look at the areas that he wasn't monitored in and verify that they weren't rad controlled areas.

DR. ULSH: Well, actually you bring up a good --

MR. GRIFFON: And I don't know if you have that much information on the work history card.

DR. ULSH: I don't, but you bring up a good point, Mark, and that is you've got workers who were officially stationed, you know, wherever it was, cold areas or wherever. But on occasion they might have gone into Building 776 or some other area where people who work there all the time were at higher exposure potential. That is certainly true, and this is a case in point. This guy went into Building 776 after the fire. But in determining his total dose potential you have to take into account not only the dose rate that he might have been exposed to, Building 776 tended to have higher dose rates than other areas onsite. But you also have to take into account the amount of time that he spent there. As a to go in for an hour and and leave does not in and of itself indicate a high exposure potential. So you got to, you know this.

MR. GRIFFON: What I don't get is how someone makes that decision, you know, from

year to year. Maybe a supervisor or maybe he, himself, determined, I don't know how that kind of person goes on and off the program that much. But the main question I wanted was to see if you had backup analysis for the document that could help me just review that quickly.

DR. ULSH: I'm sorry I can't save you that step.

MR. GRIFFON: The job history cards we have will --

DR. ULSH: Yes.

MR. GRIFFON: -- and we can certainly pick out a few that were some questions about and review them that way. That's fine.

Joe, did you have any, Joe or Arjun, Arjun's not here. Is there anything before we break for lunch?

DR. MAKHIJANI: Let me just look at my notes.

MR. FITZGERALD: And if this was the case for all these cases that you were able to by virtue of the job histories be able to construct an explanation. I mean, it seems like except for the one case that was detailed

enough and plausible enough to make that call.

DR. ULSH: That was our conclusion, but let me clarify something you just said. The job exposure histories, those cards, they only exist for --

MR. FITZGERALD: Up through.

DR. ULSH: Well, up into the '80s and only for prime, employees of the prime contractor. So if you have an S&W guy, you're not going to find a card. And I don't think that it's true to say that even a 100 percent of the primes have the cards as well. I can't swear to that fact.

DR. LITTLE: I think that's correct. We have some of them at least, but not very many.

DR. ULSH: Not many, but --

DR. LITTLE: They have a card and it just doesn't have all the information. We know he worked there for a longer period of time, but it doesn't show, it doesn't have every job change he ever went through.

DR. ULSH: But by and large the cards are there for the primes, and that was the primary resource that we relied upon to determine their work histories. Now, if that wasn't

there, for instance in the case of subcontractors, we went into the actual rad file to look for clues. Like on the urinalysis cards, what buildings that they were in. Frequently some of the earlier urinalysis cards, and there's also documentation in there for what employer, who their employer was. That's how we determined that they were subs.

MR. FITZGERALD: And the only fly in the ointment in a sense though, even though I think the photographer clearly went into 776, the dosimetry department really just knows that these individuals were assigned to, say, 44 and 41 and based on that that they would not monitor or would not read the badges unless in fact the supervisor would call them out.

So in a sense you don't really know if these workers might have moved around even though they had the same department number. The supposition is that they probably worked and stayed in those areas unless you have information otherwise. I mean, that part of it, that's the only part that can't

necessarily be pinned down by the job history, that they moved around.

DR. ULSH: I think it would be over-interpreting the job exposure history cards to say that if a person was based in Building 123, he never went to 776. I wouldn't make that assumption at all. But I think that he, you can make the assumption that he spent most of his time probably in 123 and periodically, occasionally, maybe went into the other buildings.

MR. FITZGERALD: Right, the situation you see at some sites where even though they carried the department number, they actually did something entirely different or did other work.

DR. ULSH: Joe, I don't think you would expect that, but I don't necessarily want to --

MR. GRIFFON: Well, the one example, but there was a pipe fitter in there, and that was one I would question. I would question the crafts. Sometimes they work out of a, and maybe it would have been a clean pipe shop but they get sent to the various buildings --

MR. FITZGERALD: We went through this at Y-12. Sometimes what shows up on the job card doesn't reflect what they end up doing because they get, go over and help so-and-so in 776 do this kind of maintenance work, and because the reader's only going to see the department number, they're going to say, well, this person's in a low exposure area. We're not going to read the badge, but yet maybe they were doing other work. Now I think for a lot of these that wouldn't be the problem, but for the crafts, there's a few crafts people I think you pointed out --

DR. ULSH: I think actually though, and they're all flowing together for me now, I know that I have seen pipe fitters who were, who operated out of Building 776. They did jobs in there and you do see monitoring data for them. I don't want to overstate the case though.

MR. FITZGERALD: Right.

DR. ULSH: I mean I think that would depend on where they were located.

MR. GRIFFON: I guess then in summary if we're wrapping this one up, and I think we

are, I think the biggest and most important new piece of information I heard was, which may make this sort of analysis more difficult, is that there wasn't a clean policy in '64 to monitor 100 percent. I mean, that wasn't, it was in part based on their radiation exposure potential.

DR. ULSH: That was a misinterpretation on our part.

MR. GRIFFON: And that does make it difficult. We don't have that bright line anymore to say, you know, even though this person's a secretary post-'64, they should have been monitored. That's not the case. That does make, that makes the evaluation certainly there's more gray in there. But I mean that's where we're at so we've got to deal with it.

And then the '69, just for one final clarification, the '69 in the memo, there's no indication that that was prior, that policy of not reading even when people were badged, not reading some badges, it didn't extend to prior, I know you looked post, but did you look prior to '69? There's no indication that

it would have started before. I can't remember how the memo read.

DR. ULSH: You're right.

DR. LITTLE: The memo was written for the March report, the March progress report in 1969, and so it took effect for the first quarter.

MR. GRIFFON: And it said we initiated this policy --

DR. LITTLE: Yes.

DR. ULSH: And the other thing, recall the thing that originally brought this to our attention was SC&A found that there were high zeros, and we didn't see that in '68. We did see it in '69 and '70. So the weight of the evidence, Mark, doesn't suggest that it was before then.

DR. MAKHIJANI: A couple of things. One sort of one thing of detail and one of a bigger thing. Page ten of NIOSH's 1969 report, in the middle there it says Table X-4, NIOSH Response Table X-4 is slightly misleading with the column labeled Deep Dose 1969 refers only to the first quarter. It's not clear what information we gleaned. I just

wanted to clarify that. And in our 1969 paper, Table X-4 is labeled, I think, Fourth Quarter 1968 and First Quarter 1969. So I think there should be no confusion about what's in there even though the titles in the individual columns --

DR. LITTLE: I understand that.

DR. MAKHIJANI: So the point of the comparison was similar to what you did for the full year, 1969, just if you look at case number 102 and 103 -- and these are made up case numbers -- the beta dose was 1240 millirem and 1880 millirem. That was more than ten percent of the exposure potential, but then they were, their badges weren't read in the first quarter. Now there may be an explanation for that or not, but we found that if you just literally interpret the policy for people with low exposure potential, their badges weren't being read and here you have a couple of examples at least of people over the ten percent limit whose badges weren't being read, and you know, all of them were non-zeros above the limit of detection.

DR. LITTLE: Well, the policy doesn't say

ten percent. That '69 policy doesn't say ten percent.

DR. MAKHIJANI: Right, I agree with that.

DR. LITTLE: That's a different memo that has to do with a different issue.

DR. MAKHIJANI: The consistence or implication has been the common thread is low exposure potential, and the reason I say ten percent --

DR. LITTLE: That part's true.

DR. MAKHIJANI: -- is that that's the one quantitative guideline that has been consistently on the table as to what the term means other than whatever, unless you're interpreting it to say whatever the supervisor thinks on any given day. The only quantitative analysis is that ten percent of exposure potential.

So I'm just saying if I seem puzzled why this table is there. And that's why this table is there. First of all there's a bunch of non-zero readings and then a couple of them were over the ten percent exposure potential. Then their badges weren't read in the next quarter. They don't make a judgment about

what happened there, but it certainly raised a question. All these things were put in there because it raised a question.

DR. LITTLE: I guess one of the questions would be is ten percent a significant number or not.

DR. MAKHIJANI: Well, it seemed to be significant in terms of the policy of the time as NIOSH has represented it --

DR. LITTLE: But the 1969 policy that doesn't say ten percent. I keep saying ten percent, but that policy doesn't say ten percent. It says significant.

DR. MAKHIJANI: And was there an idea then of what significant might be if not ten percent?

DR. ULSH: Not defined.

DR. MAKHIJANI: Oh, I think that multiplies the problem.

DR. ULSH: It's not defined in and of itself. The memo itself says people who were in non-plutonium areas on quarterly badge exchange cycles would not be, their badges would not be read unless circumstances warranted. That's all it says.

DR. MAKHIJANI: I have read the memo. I understand that, but you know, if it is that subjective as being now presented, that implicitly, I understood that implicitly at least the supervisor's guideline would be ten percent even though the memo doesn't say that. I agree with you on that. It does say extraordinary circumstances or some such thing. The badge will be read when warranted.

DR. LITTLE: I think it's important to keep in mind these are quarterly badges, too, these are not monthly badges. There are a bunch of other people out there getting monitored on a monthly basis, on a biweekly basis --

DR. ULSH: And the policy doesn't affect them.

DR. LITTLE: Right, the policy's not, I think we've got to keep that in mind that if someone in a supervisory or the health physics operations role was to decide who was on a quarterly or who was on a monthly, you're not going to put somebody with a high potential on a quarterly badge.

DR. MAKHIJANI: Well, naturally you only looked at quarterly badges here.

DR. LITTLE: You've got to keep that in mind. This population is low exposed, period.

MS. MUNN: One of the things that seems fairly obvious when you're determining policy with respect to radiation exposure on a site like Rocky Flats where you have such a strong, well-rounded health physics department overseeing these issues, it would seem logical that the health physicists would have been part and parcel of any policy-making with respect to where exposures could or could not be considered to be, to have an impact on the workforce.

So when we talk about who makes these decisions, and you're talking about a site where you have professionals designated to make those decisions, can't we be reasonably certain that the health physics staff certainly would have made surveys in all these areas would be the final authority with respect to what workers were likely to be exposed and which ones were really low exposed?

DR. MAKHIJANI: You know, I don't think it's a question about whether there was a final

authority or not. It's a question in my mind as to how you go back and know what the quantitative implications of what they were thinking in the context of putting a number to it for somebody's dose which is the problem at hand. And some of these numbers indicate that some people were exposed.

One guideline we have from the '50s that a quantitatively low exposure potential is ten percent, and you use that as a guideline in this context to decide whether there was some consistency in that policy or not. It's not clear that there was.

And now maybe the foundry workers were all monitored and we'll take a look at that. But when we found the data gaps, it wasn't clear from the universe of people that may not have been monitored or whose badges weren't read as to what the import of those judgments were for dose reconstruction.

So it isn't like casting aspersions on what the health physics staff did. It's a question, answering a different question than what they were trying to answer. How do you go back and put a number that says this is a

bounding dose for this population of people which is a very different question I think than those that we're trying to answer.

DR. ULSH: Well, let me perhaps address that question directly. What do you do? You have this policy in place that people who were wearing badges but weren't monitored. By and large I think we're safe in assuming that these people were at low exposure potential. Now I can't tell you that every single one of them was. I can't tell you that. I mean, this is a human institution. Mistakes happen sometimes.

But what is the implication of having these zeros that aren't really zeros. They're, in fact, unmonitored. And I think SC&A's correctly pointed out that in this situation you can't just blindly assign missed dose and assume that it bounds the exposure. That is entirely correct. You have to consider, if you're going to do that, you have to provide some rationale for doing that.

And I think that we have made an attempt to do that by showing when people were monitored, what were they getting compared to

the coworker doses. And we've presented, I think, a fairly strong case that in fact applying missed dose here in this situation would by and large be claimant favorable.

But even if at the end of the day the working group disagrees with that, you know what, we just don't find that convincing. Well, we always have the option of saying these zeros that we see in 1969 and '70 are suspect. They're not real. We can't really work with them so we throw them out. We don't use the zeros when we calculate coworker distributions. We use only the positive recorded doses. Now that's a possibility.

Of course, it's going to make the coworker doses go up. Of course, it will, especially at the 50th percentile. I think it's better to go with the missed dose approach, but if at the end of the day the working group doesn't concur, then that's always a possibility. I don't think this is an SEC issue because we have a way to address it. It's just a matter of agreeing on what way is appropriate to address it.

MR. ELLIOTT: Another option might be -- if

I can throw this on the table -- another option might be that you take up the assumption that those people who were badged but the badges weren't read, they're unmonitored, had a similar, if not the same type and level of exposure potential as when they were badged and the badge was read and use that assumption to build your distribution and take your appropriate percentile.

DR. ULSH: I think that would be claimant favorable.

MR. ELLIOTT: I think it would be claimant favorable.

DR. ULSH: Because you recall what happened in '69 compared to, say, 1968. 'Sixty-eight, Rocky Flats is operating. They're producing plutonium and uranium. No, I'm sorry. The enriched uranium was gone by then. They might be (unintelligible) used up. But in '69 we had that fire that shut down plutonium operations essentially for a large chunk of the year. So I think if you assumed that the conditions that might have applied in, say, 1968 would bound 1969. That would be a safe assumption because of that event if for no

other reason.

MR. ELLIOTT: That's just another option.

DR. MAKHIJANI: Let me lead to a bigger point which is in our report, we raised two issues with regard to 1969. One was the issue of, you know, you've got these zeros that really were gaps that are different than limit of detection.

MR. ELLIOTT: It's not a missed dose.

DR. MAKHIJANI: The gaps when badges were not read, you've thrown away the badges. You have no way to verify what actually happened because the badges were thrown away. The position in our paper was that once you throw away the badges and don't read it in the first place, that becomes a data integrity problem of some proportion. Whether the doses were low or not.

Even if all the judgments that were made were right, and the people were actually exposed to very low levels of radiation becomes a problem in its own right. And we said would we meet the normal tests of scientific integrity. And that's what, the judgment that was made in the report that we

sent you.

So there's got to be some way of dealing with, it was done not with the intent of covering up high doses or anything, and we said that, too. It wasn't done with that intent. It was done with the intent of following that policy. But now you've got a set of data in which two kind of zeros are mixed up. And moreover, one set of zeros in 1969 resulted from a questionable policy at best.

And so then the question how you deal with, how do you mix up the values from a questionable policy with legitimate values that were zeros from reading badges. And I think dropping, there may be, there are solutions to it that's up to the working group and the Board to determine. But that is kind of an issue in its right that needs to be addressed.

But I agree on that, you know, you say that they need to be disentangled, and they do. These two kind of zeros need to be disentangled.

DR. ULSH: Well, we could, okay, now that we

know that there are a certain population of zeros that really can't be trusted because they're actually unmonitored doses, we're faced with a couple of questions. I mean, we can tell by looking at the laboratory worksheets which ones are the ones that weren't read because there are zeros at the top and a red arrow down the page. So we could go through and manually pull those out.

Alternatively, for reasons of efficiency and it's claimant favorable, we just say, you know what? Forget it. Take all the zeros out. There might be some legitimate zeros, but it's claimant favorable to go ahead and just take them out. And for terms of efficiency I don't care about, I mean I don't have any objection to giving workers a little higher than what they got. I don't have a problem with that just for a matter of --

MR. GRIFFON: I thought at one point you also indicated that this was all quarterly people. So you can find quarterly and drop all the quarterly end zeros.

DR. ULSH: Yeah, you can do that, Mark, if you go in and manually find out, find those

quarterlies. I might be confusing a couple of issues now, but I think in HIS-20 there's a lump sum prior to a certain year, and I don't remember which, some time in the '70s. So it might not be easy to do that.

DR. LITTLE: Yeah, that would have been '69 or '70.

DR. ULSH: It might not be easy to do that on a systematic basis, but yeah, you could do that. We could do that.

MR. ELLIOTT: Can we agree that this is a site profile dose reconstruction issue and how we go about handling missed dose versus unmonitored dose in the sense and not an SEC issue?

MS. MUNN: I certainly agree that's the case.

MR. GRIFFON: I think there's still this proof of process question that I have, but I think it's, I think we're close to there. I'm not sure I'm there yet.

MR. FITZGERALD: It's becoming more tractable.

MR. GRIFFON: I mean, I think we need some, there is still proof in my mind --

MR. FITZGERALD: I think this goes a long way to explain the process and the fact that the data can be worked which is not something that was clear before. So, yeah, I think in terms of just understanding how it would be implemented, it's sort of the gold standard with the actual, get an actual claim, but I understand that's a tough proposition.

DR. ULSH: And we're not going to have a claim that exists currently.

MR. ELLIOTT: I understand your intent of proof of process, but only, I'd offer this only for your consideration and for the record. Proof of process is not going to be fully established until the last claim is reconstructed. As we do individual dose reconstructions every claim has its set of circumstances around it that could be brought to question. And so, yes, I want a healthy pursuit --

MR. GRIFFON: And that's what I'm saying.

MR. ELLIOTT: -- of process as best we can.

MR. GRIFFON: And that's why we identified that's sort of illustrative of what we want.

MR. ELLIOTT: Just keep in mind.

DR. ULSH: Now, Mark, for this case, I mean this particular case where there's not going to be an existing dose reconstruction that illustrates how we would handle this. I mean we can set up just as an example a dose reconstruction like we presented before. You know, a worker who worked from 1968 to 1971, and here's how we would reconstruct his external dose, and he's unmonitored. That would be a simple example to put together and to show to the working group how we would do this. Is that the kind of thing that you're talking about?

MR. GRIFFON: Well, I think that you have for these coworker ones I think you've identified. You gave us a count at the last meeting of 100 and some that used OTIB-58.

DR. ULSH: That is true, Mark, but keep in --

MR. GRIFFON: Why don't I just pick one of those cases?

DR. ULSH: Well, keep in -- I can do that, but keep in mind that OTIB-58 as it is currently written doesn't incorporate these things that we've talked about.

MR. GRIFFON: Okay.

DR. ULSH: Excluding the zeros or applying missed dose or, well, it does incorporate applying missed dose, but it kind of determines what kind of agreement we come to.

MR. GRIFFON: I think that, I mean, it may be that we see that example and we say we're comfortable with this approach. We don't need to drop all these -- I mean, you know, I would say at least offer that and then maybe you can add on an explanation that, you know, look at this and consider our discussion at the last work group meeting. We could possibly do this for this time period or whatever.

DR. ULSH: I will take that as an action item to locate the dose reconstructions currently completed using external coworker data in 1969 preferably, and '70. I'll try to find one of those for you.

MR. GRIFFON: I don't think it has to be adjudicated unless we do a full case review, right? We're not --

MR. SHARFI: Most of those are more recent which might not be adjudicated.

DR. ULSH: I assume that that's not an issue

unless we --

MR. ELLIOTT: You can do that. You just can't report out.

DR. MAKHIJANI: But is there some value -- there is in my personal opinion, but is there some value for this issue where non-reading of issued badges has resulted in zeros and data records, simply purge that data record, and you're saying you've identified a set of data that for the particular reason, bad data, purge the record of the bad data. And as a result, so you've gotten, there's a process issue there of how you treat that data. And then you can also show, obviously, the result of that that the reconstructions become more claimant favorable because you've removed a bunch of zeros. And I don't know if that solves everything, but I kind of have a concern about a process that leaves data that's been identified as having an integrity problem. There's agreement --

DR. ULSH: There's two parts --

DR. MAKHIJANI: -- yeah, so I see this as a two-part issue. How do you deal with identified bad data? And I think one way to

deal with it is to get rid of it. I mean, potentially, of course, this is new --

MR. GRIFFON: Just a possibility.

DR. MAKHIJANI: -- and I think Brant did bring that up so that struck me as something that, and Larry mentioned it informally earlier on, and it struck me as something that would be valuable to consider because it's a precedence. It's the first time we're dealing with a situation --

MR. GRIFFON: Yeah, Jim, go ahead, Jim.

DR. NETON (by Telephone): We keep talking about integrity issues and bad data, and I think that a little bit oversteps the issue. I view these workers, and essentially we would treat them as unmonitored workers, period, as if the badge was never issued. I'm not sure how that would create a data integrity issue. I mean, then you have the situation of deciding whether the workers who were processed with their badge readings were actually representative of the workforce, or if not, were these the highest exposed workers in the workforce. The only way that would become invalid is if they selectively threw

away the highest badges they could find or they thought would be high.

MR. GRIFFON: Right, we have all indications that it was the other, the reverse.

DR. NETON (by Telephone): It's a little bit overstating the issue to say that there's the bad data and integrity issues here.

DR. MAKHIJANI: Well, the only way in which I used that, I did not use it in the sense that you were talking about. What you were saying is can it be addressed technically and was there some kind of malfeasance, you know, they were trying to cover up high doses. And I think we've said explicitly that they were not, that we haven't found any evidence that this was some kind of a problem or trying to hide high doses. It wasn't to the best that we can tell.

The only reason I used those terms and the terms that are there in our report is when you issue badges that you didn't read and threw away the badges and then wrote zeros, this seems to me like a problem in its own right even though we know that these workers were on quarterly cycles and generally judged

to be in lower exposure potential and all of that. It may be that in some other situation that that may not be a low exposure potential people and you have to decide how you're going to deal with that.

MR. ELLIOTT: It seems to me we ought to take the zero as a zero.

DR. MAKHIJANI: Right.

MR. ELLIOTT: If the recording had been not read, then I think we'd be in a different, we would all be saying, hey, we won't use that stuff. We misinterpreted -- as I understand it -- those zeros and treated them as missed dose where we should have treated them as unmonitored dose.

DR. MAKHIJANI: That's right. And when that is done then the data integrity problem --

MR. FITZGERALD: Yeah, I think that takes care of it.

DR. WADE: We need to think a little bit about lunch.

MR. GRIFFON: Yes.

DR. WADE: What time do you think we want to get back so I can tell these people.

MR. GRIFFON: About 1:30.

DR. WADE: We're going to aim at 1:30 to get back. We're going to break contact and aim at 1:30.

(Whereupon a lunch break was taken from 12:30 p.m. until 1:30 p.m.)

DR. WADE: Is Robert Presley with us? Robert?

MR. PRESLEY (by Telephone): Yes, I am.

DR. WADE: And Mike Gibson? Mike, are you with us?

(no response)

DR. WADE: Mike Gibson on mute?

(no response)

DR. WADE: Any other Board members on the line?

(no response)

DR. WADE: Any other members of the Advisory Board, fine people all, on the line?

(no response)

DR. WADE: Okay, we're ready to begin here then.

Mark.

MR. GRIFFON: I don't know if we have anything more to close out of data completeness. I think we kind of wrapped it

up on data completeness. And if that's the case, let's go to move on to the thorium question, the next thing on the agenda. The last report came from NIOSH, right?

THORIUM ISSUE

MR. FITZGERALD: Right, we really came down to two fundamental issues for thorium. One was the question, source term and some of the relatively recent information that came out of the Dow discussions. And the other issue, I think, is the model itself, NUREG-1400. So those are the two focal points. There are some other issues, but those are the two key ones that we've addressed, and I think we're prepared to respond to both of those.

DR. MAKHIJANI: Do you want us --

MR. FITZGERALD: Yeah, you can jump in.

DR. MAKHIJANI: It's a long paper, and I can't say we've gone through it all carefully so it's a little bit of a preliminary response. But just to get to the main issues that were there in terms of NUREG-1400, NIOSH has done some new analysis in terms of validating NUREG-1400 with data from a couple of sites. The issue really goes quite a long

ways. They've taken their data from the site, from Simonds and one other site --

DR. ULSH: Rocky Flats.

DR. MAKHIJANI: Rocky Flats, I read it very early in the morning.

UNIDENTIFIED: Can you turn up the volume a little bit? We can hardly hear anyone.

DR. WADE: We're going to try. I don't know whether that works for you. We're going to also do some microphone readjustment spatially.

MS. MUNN: And persuade Arjun to speak up.

DR. WADE: Ask Arjun to speak up and not into a computer.

DR. MAKHIJANI: From Simonds the data validation took a weighted average data, compared it to the NUREG-1400 result, and the differences in this analysis compared to the October analysis that NIOSH did was that there were two factors of ten that were not in this comparison. The source term was not reduced by a factor of ten, and the confinement factor was assumed to be one since, in this case, it was unventilated compared to the assumption for Rocky Flats, ventilated.

And the comparison came out quite well for, in both cases, for NUREG-1400. The reservation that I have about this Simonds analysis -- I don't remember the other one as well -- it is that it was done on the basis of a weighted average. And we have on previous reviews, both in an SEC and TBD context, for instance, at Mallinckrodt said that you can't use weighted averages for bounding dose estimates. And that's what we're after here is if we're after a bounding dose estimate, a weighted average can't be used to validate NUREG-1400 for that. Because there are a lot of variations from one day to the next, and one worker to the next, and you need something like a 95 percentile to validate it.

And very often in the early days, like at Simonds, I don't know about Simonds, but certainly in several other places, the number of measurements that go into each location are sometime one, two, three, four, typically in that range. And so it raises questions about how you're going to come up with a 95 percentile of that. We recommended it but haven't seen a method for it.

So that's a kind of caveat, but I think that said that this analysis and this validation certainly you know, set any of our concerns. But there was the analysis of an actual operational process in NIOSH's December report that showed considerably higher doses than calculated for NUREG-1400. Now NIOSH has dropped the source term factor, reducing the source term by a factor of ten which we think also resolves some of our concerns.

But John Mauro has been looking more at the operational processes question, and maybe John might summarize our finding. We still have reservations about using NUREG-1400 even though this analysis carries things quite a lot farther.

UNIDENTIFIED: Could you speak up a little bit?

DR. MAKHIJANI: I said we still have reservations for using NUREG-1400 versus using data from the time that actually reflects dust loading where you might be able to put a 95 percentile on similar operations. So we have that reservation still, and John will inform you of some of the research he's been doing

because I haven't done that.

DR. MAURO (by Telephone): In fact, I'd like to just pass on that recently Jim Neton provided a report to us at SC&A specifically on thorium. And there is a very nice chapter that summarizes the machining experience of thorium and uranium. That's a relatively new document that has a lot of information that's I think very relevant to thorium machining issues and the potential for airborne exposures.

And, of course, the last time we spoke I had mentioned a reference that we referred to as the A-D-L-E-R, Adler report. That also has a great deal of information on machining uranium. My sense is that that source of information which presents airborne dust loadings for a whole range of those types of operations, machining operations, extrusion operations, is going to be a very important resource not only to address thorium activities, handling activities, machining activities for Rocky, but I guess across the complex.

And so I would suggest rather than

going to the NUREG as your default method, that actually there appears to be pretty good reports out there with actual measurements of both uranium and to a lesser extent, much lesser extent, thorium. But it's clear from reading these reports that the experience of machining uranium has applicability to the machining of thorium also in terms of the milligrams per cubic meter that might be generated during various types of machining operations.

So I guess my perspective is that we have a situation where I think it's tractable. It's a matter of just selecting the proper dust loadings associated with the types of activities that took place at Rocky with regard to machining thorium. And, of course, there's still a question of the extent of that exposure, that is, who was exposed and how often, you know, the time periods in which the exposures may have occurred.

But certainly, that's going to be a matter that needs to be looked at. I think that the NUREG approach is not the best approach for this particular case because I

think there is some good information out there.

MR. GRIFFON: John, just to clarify, the reference you're talking about is Albert? Is that --

DR. MAURO (by Telephone): Yeah, it's the Roy Albert book, and I don't know if Jim's on the line. He graciously actually had the whole book, about 200 pages, scanned and then sent me a CD. And I sent the CD on, and meanwhile, Mark, I'm trying to get a copy to you. Probably, it's a large file so I don't think they were able to electronically send it to you, but I did ask Judy, the office manager, to send you a CD Federal Express. It will probably arrive at your home today.

MR. GRIFFON: That's fine. The other reference you made I saw some funny expressions. The Adler document, I think when you said we discussed it last time we talked, it was actually at the Chapman Valve meeting. Not everyone in here was at that meeting.

DR. MAURO (by Telephone): My apologies, that's correct.

MR. GRIFFON: Adler is the other, a similar

reference about uranium machining.

DR. NETON (by Telephone): Mark, Adley I think is the name of that document.

MR. GRIFFON: What is it?

DR. NETON (by Telephone): Adley.

MR. GRIFFON: Adley, okay.

DR. NETON (by Telephone): John, I'd like to take credit for having that reproduced, but Brant bore the brunt of that responsibility.

DR. MAURO (by Telephone): Okay. With regard to the Adley report, Jim, is that now up on your website anywhere?

DR. NETON (by Telephone): The Adley document. You know, there's so much going on, I don't know. I know I committed to having it up there. I think it is, but I can't swear to it. I'll have to check.

DR. MAURO (by Telephone): I think both documents are really very important source documents that will help us deal with uranium and thorium dust loading in the early years and practices and experience. They're going to have value for now with this particular issue that we're dealing with now, but across the board.

DR. MAKHIJANI: So the sum of this, there are two pieces of the thorium issue. One is the dose reconstruction for the source terms that have been identified, and the sum of that is while NUREG has been considerably clarified, and we don't have the same kind of really grievous reservations that in this situation partly because it's the bounding nature of this thing hasn't been demonstrated by the use of weighted averages. There is, there are data available that should be examined, but since we've come to that conclusion we can say that in principle it should be possible to proceed for the source terms that are known, calculate --

MR. GRIFFON: Calculate more of a site profile --

DR. MAKHIJANI: So it seems like there should, this piece of it where the source terms are identified should be more of a site profile issue. Then there's the question of what are the source terms.

DR. MAURO (by Telephone): But I do think it's a point that other folks look at these documents. I think I, I mean, I've looked

very closely at them for various reasons, and I just brought this up because I think it may have applicability here, but I think it's important that, you know, everyone around the table feel comfortable that this strategy is, in fact, reasonable.

DR. MAKHIJANI: Yeah, and just, I don't think anybody else on our team has looked at it. John is the only one, and he's been urging us to do it, and I certainly intend to do it.

MR. FITZGERALD: Right, I think we got the material late last week.

DR. MAKHIJANI: So in the spirit of our comments being in a preliminary way, just trying to share with you what, where we are.

MR. GRIFFON: But I think at least for that those two things, like you said, the source term and the exposure model, and I think at least we're probably at the point where we can say we may not agree with them all right now, but we think it can be, there are ways to model and bound the dose assuming we know the source term. Is that a fair synopsis?

DR. MAKHIJANI: Yes, I think that's fair.

MR. GRIFFON: And then I think the upshot of that I think is that it's removed from our SEC sort of deliberations, at least that aspect of it. We want to still bring it to ground, but it's not on that urgent, profile.

DR. MAKHIJANI: And on the thorium strikes piece of it, I still don't see the logic of NIOSH's argument, but if we accept 100 Becquerels as the alarm point of the maximum that could have possibly have happened, that's in the same kind of category. The one Becquerel piece that comes out of NUREG-1400 remains unconvincing.

John?

DR. MAURO (by Telephone): Yes.

DR. MAKHIJANI: Right? Okay.

DR. MAURO (by Telephone): Oh, I agree. I think when you've got data that is directly applicable to the problem at hand, I would not resort to the NUREG and reserve use of the NUREG for circumstances and then use it. When I look at the results, the dust loading that was coming out of urinalysis were so low that I didn't find them convincing at all. And then when we came across these other reports

that dealt with this very issue, that seemed to be by far the superior method of coming at this problem.

MR. GRIFFON: Okay, so then where are we at with the source term?

DR. MAKHIJANI: With the source term the, for the thorium source term we're more or less in the same place. We haven't found any evidence that there were more things with thorium that happened. Haven't had a chance to look at the declassified material on the O drive. Thank you for doing that, and I'm intending to look at it.

The issue isn't whether NIOSH has, this should never be whether NIOSH is properly representing the classified data that it has reviewed. The issue has been that as the discussion has gone on new things have come to light, not in the sense of the maximum amount of material that was stored at Rocky Flats. At least until 1976, we seem to have a pretty good fix on that, the declassified documents about it that have been in the discussion for some time.

But it was a surprise that in

December, you know, after saying that we had gone through the classified documents and it's six kilograms ten times a year, that's the main source term that a -- what was it? Three times or four times six? I can't remember the canning and rolling source term, but it was much bigger for that 1960 year that entered the discussion.

And new air monitoring data that were not part of the discussion were part of NIOSH's report. And we have no evidence that there is another source term out there, but and we will, I think Joe can describe maybe he's going out to, you're going out to --

MR. FITZGERALD: Yeah --

DR. MAKHIJANI: Maybe that's not part of the same issue.

MR. FITZGERALD: That's not really part of the same issue. I think what it comes down to is there's been a faithful review of available documentation by both camps to the extent that I don't think there's anything left to find. I mean, I think the gold standard in this case, and I think Brant in the response you talk about shipping records.

I mean, that would have been the gold standard to demonstrate where things had actually moved and get beyond the interview for anecdotal references. But I think literally we pretty much have seen all the documentation that we can identify and the documentation isn't conclusive. We found some that was suggestive, but at this point in time it's not conclusive in terms of the source term.

So I think that's where we are, and we're willing to accept that. But there isn't conclusive evidence to demonstrate that the source term thorium is something that we should be concerned about or is outside of the descriptions that we have. So that's where we are. I mean, I don't certainly see any further actions to turn over any more rocks on this one. I think we've been at it now for more than several months so I think that's as much as one can do on this one.

MR. GRIFFON: The only thing I would ask is I don't know if is on the phone.

(no response)

MR. GRIFFON: I guess not.

DR. MAKHIJANI: The alloy issues are separate.

MR. GRIFFON: Yeah, we did ask at the last meeting if had any more information on this, and he said he was going to talk to some people, but we haven't heard back from him so I guess...

DR. MAKHIJANI: The alloy issues we have actually through the Board meeting, the last Board meeting, there was somebody from Dow Madison there, and I interviewed him. And he was quite specific -- and I believe he had been interviewed also and some of his other materials are on NIOSH's O drive, but I haven't looked at those. But I did interview him.

I don't have his interview currently back from him so I haven't circulated it. I have sent it to him for verification to make sure he agrees with what I wrote about what he said. So normally I don't circulate things until I hear back. But he very clearly said he remembers four truckloads a month going on average of magnesium-thorium alloy between 1962 and 1965 to Rocky Flats. I talked with

him in various ways. How do you know it went to Rocky Flats? How do you know it wasn't a partial shipment that dropped off most of its stuff in St. Louis? And he also recollected stamped-out parts. It was sheets, and so stamped out sheets of essentially remainder alloy coming back labeled Rocky Flats.

Now that's in direct conflict with the interviews, and we've looked at the interviews that NIOSH has done obviously, of senior people who we have no reason to disbelieve. And so I have no reason to disbelieve the person I interviewed. He seemed very straightforward. He seemed to have a very clear memory. And we haven't taken it anywhere else. I mean, we do have names of shipping clerks. Now, he didn't have documents. He did give me names of people who would have done the paperwork at Dow. We have not tracked that further.

MR. GRIFFON: He doesn't have any names on the Rocky Flats side?

DR. MAKHIJANI: He didn't have names on the Rocky Flats side. I have quite a bit of information in terms of how it could be

tracked in the Dow Madison side, but we have not done that. And that's where the names, the thorium-tungsten alloy in terms of welding we don't have SEC-type of concern so we can leave that out of the discussion.

MR. FITZGERALD: But I guess I would again go back that unless there is some more compelling documentation that would move this issue forward on the magnesium alloy, I think we were going to say that this pretty much is all one can do. And even though we have suggestive entries like this, I think the piece that NIOSH put together in the last response is a fairly comprehensive treatment of the subject. I think we're going to, again, feel that that pretty much answers the question.

Even though we still have these issues that we haven't resolved completely, I think the only thing that would resolve that would be information such as shipping records or something that would establish it went from A to B and here it is. But even then I think the inventory records and some of the other information that was included in the NIOSH

response is pretty persuasive so that's where we are.

I don't think we're going to get a perfect answer to this, but I think it's been a good faith effort on both sides to try to come to some understanding of what happened on this.

DR. MAKHIJANI: Mark, is there some, I mean, I know that had said something about looking into it. It may be, I don't know whether NIOSH should do it or we should do it or whether it should be done, but it would be good to maybe at least --

MR. FITZGERALD: I think we should close the door.

MR. GRIFFON: I think we should close the door and make sure there's no more information that they've got to add it to the fray. We don't want to find out about that in two months.

MR. ELLIOTT: So SC&A's going --

MR. GRIFFON: SC&A's going to follow up --

MR. FITZGERALD: We'll follow up with and see if he has anything on it.

MR. GRIFFON: But assuming there's no more

information there, I think it's a pretty much closed item.

MR. FITZGERALD: Yes.

MR. GRIFFON: Response?

DR. ULSH: Well, I am gratified to hear that we've reached consensus that while we may not agree on every point on thorium, it doesn't look like it presents SEC implications at this time. That's I think what I heard. So I'm gratified that we've reached that point. It was an arduous process coming to this point, so that's very gratifying.

And I don't really want to rock the boat since it was so hard to get to this point, but with regard to NUREG-1400, perhaps that discussion can happen outside of the context of an SEC consideration. I hear what you're saying. I hear that you're not yet convinced. We did --

MR. ELLIOTT: Can I stop you just there?

DR. ULSH: Yes, maybe you should.

MR. ELLIOTT: Well, you know, SC&A's going to finalize their report, and I would hope that in that finalization of this point alone they would refer to the consensus I think I

hear today and designate the issue as being site profile related then we can take it up in that form. If you're explicit enough in what your concern is about NUREG, then we can react to it from this report in a site profile discussion form.

DR. MAKHIJANI: Yeah, we will do that. I mean, John and I have talked about this and obviously Joe and I have talked about this, and I'm going to be re-drafting this for our internal review this week.

MR. FITZGERALD: Yeah, I think there's going to be a number of issues that will be like that where we didn't agree on some of the details and implementation, but clearly, it's just an advise. And I think we actually are, we'll get to this in a bit, but with Ron Buchanan's piece on external we've been kind of probing those kinds of issues now for a couple months just trying to figure out what the site profile-type implications are.

MR. ELLIOTT: I think to do all the work that's gone, done underway here, and yet contain and maintain the focus on what we need to continue to discuss outside of an SEC --

DR. WADE: And remember this work group was constituted to look at both SEC issues and site profile issues. You set the order that way, and that's reasonable. It shouldn't be left unresolved.

DR. MAKHIJANI: I will try to give you enough details so we can proceed.

MS. MUNN: It would really be nice if we could put the SEC portion of this to bed.

MR. GRIFFON: We've got agreement on that.

MS. MUNN: And define that all other outstanding items in this regard are site profile issues that we'll address in that way.

DR. ULSH: I'm done.

DATA INTEGRITY, SAFETY CONCERNS AND LOG BOOKS

MR. GRIFFON: I think we're under what I'll define as an update item and the first one -- I've lumped these three together -- is data integrity, safety concerns and logbooks. I think the logbook one is probably the one that we have a most recent response from NIOSH on. Is that correct?

MR. FITZGERALD: Yeah, well, we also got one on data integrity, right, so just to back up a little bit, certainly the conclusion from the

pieces in January that we provided that we're responding to is even though there may be some specific disagreements on individual cases that figured in those reviews, or specific logbooks that have figured in those reviews.

In general, we felt that there was no pattern or evidence of a systemic issue. Evidence where it was clear that by virtue of policy or by virtue of practice that the records were being altered, falsified or entries were made intentionally that were not in fact valid. So we did decide that it didn't rise to that level where we would believe an SEC issue exists of the logbooks review.

And, of course, the genesis of that was to take from the petitioners and claimants concerns of whether or not this was going on and to establish in some means, this was typical at Rocky because there really wasn't anything hard-edged that gave you a substantiation of the issues so we had to sort of do a secondary source to look at logbooks.

And these were all recommendations from and from the former union to go

ahead and look at the logbooks, look at safety concerns. And we did look at the logbooks. The response certainly points out that there is agreement on the SEC issue. It does give us a wealth of specific comments though on comparisons, that there are still some differences on, and we believe there are agreements.

Certainly, NIOSH has contested that interpretation. We'll take a hard look at those and certainly reflect that in the final report. If there's any technical accuracies or interpretations that these comments bear out are problems, we will go ahead and make those changes in the final draft. So that's the process I see at this point.

DR. WADE: I need to make one clarification. Just so everyone understands what might be on the table, what might not be on the table, SC&A submitted a working draft on data reliability, data integrity examples analysis, and in the attachment to that, Attachment 25, there's a column that shows the NIOSH response. That response was excerpted from the NIOSH response. And what I asked John to

do was in any subsequent documents to include the entire response, and he's agreed to do that.

MR. FITZGERALD: Yeah, and thank you for bringing it up. In one of the matrix tables to, I think this was the data integrity examples. In order to format the matrix, we, in some cases, paraphrased some of the position statements on certain examples. And NIOSH has rightfully acknowledged certain cases where that may have inappropriately changed the intent or meaning.

So what we're going to do is go back and restore the literal language. It probably can't be a matrix anymore. Some of the comments are six pages long, so it may end up being something other than a matrix, but we are going to restore the literal language and positions so that there's no misinterpretation.

DR. WADE: Very good, thank you.

MR. FITZGERALD: Of course, we'll take back or retract that original Attachment 25 as well.

MR. GRIFFON: There is a follow-up action so

it's the logbook.

MR. FITZGERALD: Yeah, in saying that in essence that the broad conclusion is that certainly we've got a request from the working group in support for NIOSH to first-hand sample, I think the term is the 450 boxes, but it really is 450 sets of data that were the total inquiry that NIOSH conducted through the Records Center in Denver. And next week on Monday Kathy Robertson-DeMers and myself, personally, we're going to go out for five days and just basically do a very defined, narrow sampling.

MS. MUNN: Thank you.

MR. FITZGERALD: You're welcome.

That is really designed just to answer some of the questions that have come up relative to coverage of certain years and certain facilities, and also to perhaps confirm some of the questions that we've raised in the course of the logbook review. But again, very specific and confined to a sampling process over a few days.

And Mountain View -- I keep saying Mountain View. I guess it's changed now. But

whatever it is now, the Records Center in Denver has contacted and they have all the sample, boxes to be sampled have been put aside and ready. So we're planning to go out Monday to do that. And we'll certainly write this up and report it back provided, through the same process that we have provided to the work group that NIOSH will see at the same time.

Certainly, General Counsel will review it for Privacy Act issues, so we'll go through the same process. We'll try to get it to you as soon as we can and as soon as we get back so there won't be any waiting for those results. Those results will be forwarded to the overall logbook review. So I think that will perhaps satisfy, there was a lingering question or two at the end of the session on logbooks that will perhaps help satisfy that and be responsive to that. But again, this is a sampling exercise not some exhaustive survey.

DR. ULSH: We talked about this in other conference calls but my understanding of what you and Kathy are looking for, what the

working group had asked originally, was you're looking for data-rich logbooks. Now we had talked earlier in this process sometime last year -- I don't know when -- that our position has been that after a certain point in time, I think --

MR. ELLIOTT: 'Seventy-one.

DR. ULSH: -- '70, '71, yeah, the logbooks that contained a lot of data ceased to be kept. There are still continuation control logbooks, form logbooks and other types that aren't as useful to us. But, Mark, I think you had expressed at one time that what you were really interested in was entries in these logbooks compared to the hardcopy rad files. So it wasn't quite, it wasn't as much of interest to compare computer printouts to computer printouts in the rad file. So what we're looking for here or what you're looking for, I guess, is data-rich logbooks that we might have missed.

MR. GRIFFON: And it may be that you have, there may be some computer printouts in these records?

MR. FITZGERALD: We're not changing, we're

not changing the comparative analysis. I think this is more of a scoping question as you point out, Brant. That's pretty much the extent of it really.

MR. GRIFFON: And I don't know, I mean there's, I think what they reported that you issued, that NIOSH issued, it's best, at least for this, in my opinion, there's a lot of specifics, responses, to SC&A's, some of the individual findings where they had discrepancies.

DR. ULSH: Are you thinking of the data integrity examples or the logbook?

MR. GRIFFON: I was thinking of both actually. I was just going to say I don't know that it's worth going through these at this point.

MR. FITZGERALD: But we haven't been able --

MR. GRIFFON: -- fully reviewed them.

MR. FITZGERALD: Yeah, we haven't been able to go through systematically. In fact, Kathy is at Pantex all this week, so in a way we'll definitely go through and item-by-item reconcile, or attempt to reconcile, the comment with the current version. Even though

we are in agreement, I think, on the SEC issue, for the safety of accuracy and representation, we will go through that process and make sure that the tables reflect the comment. Now we may not necessarily agree with each specific comment, but the ones that certainly point out accuracy issues, we do agree we want to make those changes that reflect that.

MR. GRIFFON: And then you also said in your final rev you'll be responsive, as much as you can, to NIOSH's most recent report. And I think --

MR. FITZGERALD: That's what I'm just saying, right.

MR. GRIFFON: -- the only thing I would say is from now until the time you write this report out maybe the lines can be open, too. That if SC&A had a follow-up question on your response, you know, they can call you --

DR. ULSH: As always or e-mail.

MR. GRIFFON: -- and there can be a clarification or whatever.

MR. FITZGERALD: Yeah, the iterative process will be important because of the amount of

ground we have to cover on this issue.

That covers kind of two things, too. I think on data integrity likewise we have the same context of, you know, we're in agreement overall from SEC's standpoint in terms of data reliability, but it's just specific cases that we're going to be talking through. Anyway, that's data reliability.

I think you had a Super-S, do you want to go to a Super-S?

MR. GRIFFON: I didn't know if you were done with data reliability.

MR. FITZGERALD: No, I think the key issue there is --

MR. GRIFFON: The only other thing I did want to bring up about the logbook thing, and maybe this is a mistake. On the next to the last page the question of the logbooks and your comparison with this claim versus SC&A's, and I'll preface this by saying I don't think that SC&A spent a lot of time to compare your numbers with their numbers. But I did notice that there's, you know, you end up with quite a different percentage of positive matches. I thought, well, I think we need to understand

that.

I think we need to know why, and SC&A hasn't had a chance to go through this line by line. Brant did provide, there was a spreadsheet that you posted that has the back up. So I think as a follow-up action you need to at least respond to that specifically in your write up.

I just wanted to clarify my understanding of your table. It's on page 15. There's no number or anything, but in this you say 115 out of 124. I think that might have been, supposed to have been 125, but anyway, yielding 92 percent match. I notice that the second line down it says entries with no reference in HIS-20 for ten employees. And those were excluded from your denominator in this compilation.

DR. ULSH: That's correct.

MR. GRIFFON: And I think they might have been included in SC&A's, so part if it --

DR. ULSH: That could be part of it.

MR. GRIFFON: And if was, you know, well, I guess the question, and I skimmed this, too, but I think the rationale for excluding those

was basically that they were people that had retired before this 1977 or '76, whatever data that is, and therefore, were pulled from the HIS-20 database.

DR. ULSH: Well, they never made it into the HIS-20 database.

MR. GRIFFON: And then some people would have been added back in though that retired before that date but not all.

DR. ULSH: Correct.

MR. GRIFFON: So they were people apparently not added back in.

DR. ULSH: If they were a part, they would have been added back in if they were part of the medical recall program in the late '90s. And these people are not part of the medical recall program.

MR. GRIFFON: So I guess I just want people to understand that in my opinion that's not really, I thought that it should have stayed in the denominator, but because it does reflect on the overall, you know, what's in the database versus what's not in the database. These people aren't in there. Why they were dropped, you've explained very well

why they were not in there because they weren't in there. So they have radiation hardcopy records, but they're not in the HIS-20 database.

DR. ULSH: If they were, if we did it the way that you suggested, Mark, if we included those in the denominator, it would drop the percentage agreement by a couple of percent.

MR. GRIFFON: I'm not disputing that. I was just trying to understand how you did the analysis versus how --

MR. FITZGERALD: Right, and I think that's probably the action that we're going to have to work with on that.

MR. GRIFFON: Another spreadsheet with all that detail.

MR. FITZGERALD: Understand the difference in the numbers and try to reconcile it if possible.

MR. GRIFFON: I don't think we need to go on that any further. Just to be aware of it.

MS. MUNN: What difference, is it pretty small at this point?

MR. FITZGERALD: I think except for one instance where the percentage differences were

a little higher, 20 percent difference.

MS. MUNN: Was it? Did I miss that reading too fast?

MR. FITZGERALD: I'll have to go back and check, but I think it was one parameter that was a little divergent.

MR. GRIFFON: The only other factor in this table that I'm not sure was defined the same way in both reports was this term, close match. So that might be another thing that accounts for it.

MR. FITZGERALD: It could.

MR. GRIFFON: And you describe close match as, there's 21 of these, and you, generally, you're saying that these are background readings, and the database had a value. That's why I wanted to look at the data that you have to be clear on that.

DR. ULSH: And you will find that in the spreadsheet. There were a couple of situations where I think we would categorize as a close match like you said, Mark. In the logbook perhaps it might have been recorded as background, whereas, there was a value in the HIS-20 or vice -- well, you wouldn't see

background in HIS-20.

Also, keep in mind that there are a number of different dates that are associated with particular samples. The date that it was collected. The date that it was analyzed. The date that it was reported. And so if it was pretty close in time, you know, a couple of days, we would call that a close match. So that's the kind of thing that we're talking about.

MR. GRIFFON: All right, I guess for anything else on those three items then?

DR. ULSH: No, not from me.

MR. GRIFFON: I think we're okay.

MR. FITZGERALD: I guess the only thing I would ask on the safety concerns, that was a very early piece that, I can't recall. We got a similar response from you from back when. Are you planning to review that in the same level of detail because that's going to somehow be melded in.

DR. ULSH: The reason that we didn't issue a report on safety concerns as requested by the working group, I mean, you can pretty much tell which issues are the most important from

an SEC standpoint, and we ranked safety concerns as last because, quite frankly, we're in a similar situation where SC&A and NIOSH agreed, were in concurrence, that there may not be SEC issues. There were particular instances where we may not agree on every single safety concern, but it doesn't rise to the level of SEC.

MR. FITZGERALD: Okay, so you're not as concerned on the individual case differences. I'm just trying to --

DR. ULSH: I understand. It's a good question. Like I said we put that last on the list, and we just didn't have time to issue a report, and I didn't feel that it was terribly important to do so.

MR. GRIFFON: We certainly didn't ask you to look at, respond to those individual cases.

DR. ULSH: Right. I think we're in concurrence.

SUPER S, TIB 0049

MR. GRIFFON: I think we're on to Super-S.

MR. FITZGERALD: Super-S, and I'm going to let Joyce get into this, but in general, this goes way back. The June 5 Board meeting,

Joyce Lipsztein gave a pretty detailed report to the Board in the public session about our review of OTIB-49 at that time. And certainly our conclusion was that we were in accord with a conceptual approach of the model and found it was claimant favorable and felt it addressed certainly the potential SEC issue that was raised by a petitioner relative to being able to do dose reconstruction for plutonium oxide, the Super-S mode. That was back last summer.

And beyond that I think the concern was whether or not the model cases upon which the OTIB was based were, in fact, conservative from the standpoint of being able to envelope workers that were exposed to the ’65 fire. And Joyce, with the assistance of the files that were provided for 25 workers, she’s reviewed those.

And I think the conclusion that we’ve reached -- and you haven’t seen this report yet -- but that they, in fact, are conservative. They do envelope. So we don’t see a validity question relative to those model cases. And that’s taken a little bit

longer just because of getting the records and going through a lot of process. So I think certainly it doesn't appear to be a validation problem.

And finally the third item which gets a little bit toward what Mark's been talking about to some extent which is how does the OTIB-49, in this case the model, work or apply to sort of real life situations or scenarios or circumstances at the plant. We wanted to look at that relative to some cases of workers that might have been exposed to Super-S before in vivo counting at Rocky. You know, sort of test the outer bounds of whether it would, in fact, the model would be inclusive.

And actually, we'll provide that material to you in written form. We felt it did, in fact, envelope even these cases. So in general, I think on the Super-S, and certainly on those three facets, three main facets, we felt the analysis underscores that OTIB-49 certainly addresses the Super-S issue. And there's not a, certainly no SEC issue that we can see.

Joyce, are you still on the line?

DR. LIPSZTEIN (by Telephone): Yes.

MR. FITZGERALD: Do you want to add any particulars to that?

DR. LIPSZTEIN (by Telephone): I think you summarized everything. I could not -- I analyzed all the 25, the data from all 25 workers that were involved in the ’65 fire to see the (unintelligible) that were chosen to be the design cases, the design model, and to see if there were others that could be chosen. And from the other 19 workers, only two could qualify and even one of them had prior exposures to plutonium, but he had so much exposure during the ’65 fire that maybe he would qualify also.

So I analyzed those two cases in detail, and I saw that the real model design was based on two cases, one from Hanford, one from Rocky Flats. And the -- I developed those two. So I think that we have concluded that cases were well chosen by NIOSH, that they are significantly conservative for those years.

Do you want anymore details?

MR. FITZGERALD: No, I think that’s helpful.

Don't go away though. We haven't gotten to 38 yet.

DR. LIPSZTEIN (by Telephone): They -- you were talking about the implication of 49 and other documents for some cases. We had someone that worked in Rocky Flats and was given examples of people that could be, could not have been, actually worked at Rocky Flats before in vivo counting. And there was where he did (unintelligible) these people would not have (unintelligible) calculation of the dose.

So we, based on the values it was suggested (unintelligible) Rocky Flats of exposures for each of them we would use either OTIB-49. We had to use OTIB-38. We used it with the multiplications that were agreed to be done by NIOSH which is the use of the 95th percentile. And also, we had to use for the people that had results below detection limits we had to calculate the missed dose based on the MDA.

And we saw that most of the time the application of these three documents would calculate the dose in a fair way to the workers. I think we should -- and I'm not --

it's not related to NIOSH. This is the way that they really would treat those cases and especially should discuss the application of the MDA with NIOSH. But in general, I think that the worker would be fairly treated using the documents.

MR. FITZGERALD: Just as a post script we had a number of conversations about this question of applying the coworker model and this 95th percentile. And I think the issue there is the conservatism in terms of fitting a dose distribution. And we appreciate, I think Jim has reminded us that certainly the 95th percentile in these circumstances is available to NIOSH, but again, that's NIOSH's discretion to apply that as needed. So I think there's a, maybe it's more of a site profile question on that one. But there's a question and I think Joyce has articulated it which is under what circumstance and specific case would the 95th percentile in fact be applied.

MR. GRIFFON: It may be useful to kind of one, know Joyce's scenarios that she ran and ask NIOSH to run a Super-S pre-in vivo with

the coworker model as one of the examples because I think there is this proof of process question. And I'm not sure, at least in the ones I've looked at they ever used the 95th, but maybe they would consider it, and maybe it's a plausible up or down, but I don't think it's being used currently. I think it goes back to that proof of process question.

DR. ULSH: I don't know. You kind of caught me off guard with that question about internal coworker and when we'd apply the 95th. I can tell you that in general our rule, you know, the methods that we operate under. If you have an unmonitored worker for internal, what we're going to do is if there is indication that this person was a significant exposure potential, and that's defined by working in a radiation area, for instance, then we would apply the 95th percentile.

If a person -- and I'm going to look at my ORAU colleagues here. If a person -- just to make sure that I'm saying this right. If a person only periodically visited radiation areas, had very intermittent potential exposure, then we would apply the

50th percentile. If a person never really went into radiation areas, then we would apply ambient environmental.

Now, have I misspoken? I don't think I have.

MR. SHARFI: It's more of an external issue. The 95th, 50th is more an explanation of the external issue. In the internal we have a 50th percentile, then calculate the GSD which would give you the distribution assigned, and that normally would assign, I don't know of a time that we've assigned to internal is 95th percentile, the max, the maximum bound. So like the numbers, I know in one of the previous calls we had talked about possibly using for Rocky the 95th and that was a discussion at the time --

MR. GRIFFON: Well, it was only offered as --

MR. SHARFI: Yes, it was offered as a possible solution for this particular site, but it's not a common practice for internal coworker.

DR. ULSH: With regard to Super-S and when it would be applied, I didn't catch whether

there was still some outstanding questions about that or --

MR. FITZGERALD: No, no, this was more of this context. I'm not going to get back into the conversation we spent a couple meetings and conference calls talking about this issue. But I think that was where we left it. But the fact that it was available, certainly, it might be an option. But the distribution, the question of conservatism and fitting the distribution which is where Joyce had all the concerns I think was something that would be addressed by this. But again, we're the first to admit that's not an SEC issue.

MR. GRIFFON: This is more of a coworker model side.

MR. FITZGERALD: Yeah, exactly.

Is that right, Joyce?

DR. LIPSZTEIN (by Telephone): Yes, this is the coworker model. (Unintelligible) I think it's not an SEC issue, but I think it's very important. I understood that NIOSH would apply the 95th percentile, but that's another discussion not really applied here. I think I'm (unintelligible) I think that OTIB-49 is

(unintelligible) was fairly treated by NIOSH in relation to the workers.

MR. GRIFFON: Let's save that other piece for later on, yeah.

MR. FITZGERALD: Sure.

Thank you, Joyce.

MR. GRIFFON: So then we're on, I think we're on sounds like Super-S, I mean the outstanding issue really was the, checking those other 19 cases to see if original assigned cases were bounding, and Joyce has looked at that and is happy with that. So I think we've been happy with the model for awhile. We were just doing that final piece and I think it's closed.

MR. FITZGERALD: And that final piece is in written form, and likewise, as soon as we have a chance in the next four or five business days, we'll send that over so you will have that.

NEUTRON DOSE QUESTIONS

MR. GRIFFON: Next issue is the neutron dose questions. I think you've already sort of spoke to us, Joe, but this is Ron's.

MR. FITZGERALD: Yeah, I'm always concerned

about wading into those waters because it's actually been a very intense dialogue that's been going on between ORAU and Ron Buchanan on some remaining issues. I think fundamentally probably the latter part of last year the conclusion was this didn't appear to be an SEC issue. There were some questions on tables that were included in the OTIB-58 coworker model that we had some questions and problems about. I think we've been working with NIOSH and ORAU to try to resolve those issues. And I think we're closer.

Ron?

MR. BUCHANAN (by Telephone): Yeah.

MR. FITZGERALD: How close are we?

MR. BUCHANAN (by Telephone): Yeah, this is Ron of SC&A. Yes, we have been working on this now, and what the conclusion I've reached at this point is that the model seems reasonable, doesn't present an SEC issue. I still have some questions on the application of the NDRP that I need to clear up, how the '59 values are used for '52 to '58.

From what I know at this point, I don't see that there's SEC issues

(unintelligible) site profile issues if the data's there to support the model. On OTIB-58, the coworker model, I think that that's going to have another revision from the one put out in January if I understand Brant correctly. I do have some questions on the non-penetrating there. Again, that could be site profile rather than SEC issues.

MR. FITZGERALD: Ron, could you illuminate a little bit because I think a central question was the back extrapolation on the neutron doses for that 1950, was it '52 to '59?

MR. GRIFFON: 'Fifty-two to '59.

MR. FITZGERALD: That was one of the central issues raised early on. Can you illuminate a little bit more on where that stands?

MR. BUCHANAN (by Telephone): Okay, that's '52 to '58. Our understanding is that in the NDRP report they stated that there was not enough neutron data to create year-by-year neutron-photon ratios. During this period there was very little neutron monitoring took place in '52 to '58. It didn't really begin in earnest until '59 and '60.

So what NDRP recommends is to using

the N-over-P rations from ’59 to determine the neutron dose in ’52 to ’58. And then it’s broken down by buildings, mainly the plutonium buildings. That’s where most of the monitoring took place. And if you weren’t in one of those then it falls in an all other building category.

And the way it stands now is that the NDRP report, of course, went back and calculated those doses, those neutron doses for the workers during the ’52 to ’58 period and other periods, but this is the period we’re interested in right now, using the photon dose in most cases the ’52 to ’58. Then we can calculate their neutron dose, add those together and get their total penetrating dose. And this is an acceptable method if the N-over-P values remain the same or approximately the same for ’52 to ’58 as they were in ’59.

Now, there’s one thing that I had requested that we have not had was, there were two items actually. Number one is we have some of the data for the neutron monitoring that was done ’52 to ’58, but we don’t have ID

numbers with it, and so I can't see what dose belongs to what worker.

You go back and calculate the average N-over-P values which I'd like to compare to that published in the Table 11.1 of NDRP to see if, indeed, we need some benchmarks to show that the N-over-P ratio in those early years were approximately the same as those in '59 that we're going to use, and they were used in NDRP. And so I really still need those ID numbers to go with those earlier neutron measurements to set down some benchmarks.

And the second item of concern was I'm still not clear on how many of the NDRP doses in '52 to '58 were notational doses which were calculated from N-over-P ratios, or they were average dose as compared to the actual neutron film measurement. And we have a conflict there because Roger Falk, his letter to Brant the other day said that only 1958 did they use 50 of those data. All the rest of it is occasional doses. However, Brant sent me some files that shows there's neutron data for '52 to '58 scattered in some of the workers, the

ones I need IDs for.

And so that is an area that needs to be clarified. So to summarize what I need is to be able to do some benchmarks from ’52 to ’58 to see if they fall in the range of ’59 N-over-P ratios were. And in my final write up on this Section 4, I went back and looked at some N-over-Ps that I could find from the scattered data that I got together. And it looks like the Table 11.1 NDRP, the values for N-over-P there are average values. They are not bounding values that I could find in earlier years, and I’d like to verify that.

So saying that, if that can be verified, then it looks like we can do the dose reconstruction because we have the recorded photon dose for the workers that were probably exposed to neutrons. And so that’s where it stands at this point.

MR. GRIFFON: You asked for the long explanation. That’s good. That’s good.

Joe.

MR. FITZGERALD: I was just going to say I know you’ve been in contact with your counterparts. Is that requesting that

information?

(no response)

MR. FITZGERALD: Have you made the request or is that, is this something new?

MR. BUCHANAN (by Telephone): Me? Joe?

MR. FITZGERALD: Yes.

MR. BUCHANAN (by Telephone): No, I made that request for going on a year now. I still need some ID numbers tested with data we do have for the actual neutron films that were read and re-read and from '52 to '58 so that I can go back and do some benchmarking.

MR. GRIFFON: I'm going to include that action again. If it was already given, we don't know, but either way it's an action now. And if Brant needs clarification on that, Ron, I'll ask that he contact you directly maybe and make sure we get the right stuff to --

MR. BUCHANAN (by Telephone): Yeah, that was in the August 14th phone conference we had on this subject. Now they did send me the data I requested. The ID numbers were left off, and the problem with that is a list of, a table of film badge results, but I don't know who they belong to so I can't pair them up. And that

item and then the non-penetrating in Table 7-1 of OTIB-58 are the two remaining, major remaining items in that area.

MR. GRIFFON: What's the issue on the non-penetrating?

MR. BUCHANAN (by Telephone): The non-penetrating in Table 7-1 of OTIB-58 is that the non-penetrating to penetrating has a ratio of about 1.1 to 1. And the information that I've got in some of the other data that Brant has sent me shows that the ratio is more around 1 to 5, the penetrating is one. The non-penetrating is five. And they haven't re-issued that, but I think it's going be re-issued with the same values in Table 7-1.

And so I haven't brought this up to Brant yet because I just got this information in recently. But that's another area that I would like to look at. I feel that the non-penetrating in the Table 7-1 are okay for the plutonium workers but might not bound the dose for non-penetrating for uranium workers.

MR. GRIFFON: This is TIB-58, Table 7-1?

MR. BUCHANAN (by Telephone): Yeah.

MR. FITZGERALD: Ron, just to sort of help

everybody, if you can kind of lay that out very clearly in a maybe e-mail to Brant, copy to Mark and I or the usual suspects that will, I think, help Brant out as well as --

MR. BUCHANAN (by Telephone): Yeah, right, I'll spell it out there, those two items of concern and reiterate them. Now the non-penetrating to penetrating, I just did a recent item and I haven't requested, I haven't brought that up before because we just decided what to do with Table 7-1 and OTIB-58, I mean, what Brant has recently informed us. So that is a recent item that just came up because of that.

MR. FITZGERALD: And I want to again underscore, there's been a lot of give and take on this issue over the last couple of months trying to come to closure on this. But again at this point it's not an SEC issue as much as making sure it's representative of how OTIB-58 is going to be used.

MR. GRIFFON: Yeah, I guess the one thing I would say maybe is if we can, that first item, getting the identifiers to Ron. Before we, it would be nice in the next month or so if Ron

can at least say to us he's got the data. And even if there's disagreement on what N-P ratio should be used, we can always debate that in the site profile.

MS. MUNN: We can deal with that --

MR. GRIFFON: Yeah, we can deal with that later as long as he's got information there that you can calculate N-P ratios with. I'm assuming you have the N-P identifiers. If we can get that far, that would be a plus. Then we know we can do it, and we can debate what the right number is later.

Is that it on neutron questions? I think it is.

MR. FITZGERALD: Any more Ron?

(no response)

MR. FITZGERALD: I think that's pretty much it.

MR. BUCHANAN (by Telephone): That's the major issues that (unintelligible) site profile.

MR. GRIFFON: All right, thank you.

COWORKER MODEL

Then the coworker model is the next thing I have, coworker model or models.

MR. FITZGERALD: Well, you know, certainly we had looked at each of the coworker models when they were issued from a conceptual standpoint. Ron has looked at OTIB-58. We just touched on that, and actually, this is all part of his review on OTIB-58.

Joyce has certainly looked at OTIB-38, and quite extensively in terms of the concept and how it's set up. By extension she has also looked at OTIB-14 which was the extension of OTIB-38 for D&D.

DR. ULSH: It's actually OCAS TIB-14.

MR. FITZGERALD: OCAS, okay. And even though we had some initial questions, I think input from NIOSH on the fecal versus in vivo. I think that resolved the one concern that we had on OTIB-14. So from a conceptual standpoint I think we're in accord with those models. And as I was saying for OTIB-38, we've actually more turned to looking at the application of those models and begin to look at how they would apply and whether they would, in fact, envelope the different populations.

And I guess the one thing we have not

broached as much, both Ron and Joyce, and they can dive in when they want, this question of whether the data that populates the site profiles I think is the question that we've sort of gotten into on the completeness question. But that's kind of where we're at right now in terms of the final aspects of the coworker models that we feel needs to be dealt with. Again, we've looked at parts of that, but I don't think we're completely finished with it in terms of validating.

MR. GRIFFON: And I know there's several papers out there especially related to the internal coworker model. I keep calling it Donna Cragle piece. I'm not sure it was not only Donna Cragle that wrote that comparison of HIS-20 and CER.

DR. ULSH: It was the ORAU team. I think the first author might have been Joe Lockamy. I'm not sure.

MR. GRIFFON: And then there's another one that looks at the calculating intakes using HIS-20 versus using the CER data. That's Lockamy I think. And there may be a third.

DR. ULSH: I think there were two Lockamys.

There was the first one that he wrote, and there was a follow up.

MR. GRIFFON: So I guess we, I think we need to address that certainly in your final evaluation.

MR. FITZGERALD: Right.

MR. GRIFFON: You need to address that in, I think in some of the discussions we've had, and this is how it gets back to the 95th percentile, some of the discussions we've had I think have turned on the fact that, well, the upper limits of these things, these databases look similar, and they yield similar intakes. And I asked, I think the prior action was for SC&A to look at these and make sure you were comfortable with that Lockamy analysis. Make sure --

MR. FITZGERALD: Right, and we spent, and certainly Joyce has spent time looking at those analyses and certainly one concern is this very issue that the dose distribution that she had looked at for OTIB-38, the concern was that the 50th percentile would not necessarily envelope some of the higher end doses as would the 95th. And that's where I

think this question of conservatism in terms of applying the coworker model came into play.

Is that right, Joyce?

DR. LIPSZTEIN (by Telephone): Yes, that's right, I think. The first question whether to use one distribution or the other. I looked at the two papers by Lockamy, and actually one of the things that I noticed that both CER and HIS-20 they have enough data to elaborate a model because I think that OTIB-38 is a model. It's a model based on real data, and as long as they have enough data, either of the distributions are good for application of the relation of a model. Because one of the things that has to be understood is that OTIB-38 is just a model.

The best way to draw a model from this data that's what is important in discussion. One example that I can give is, for example, on the Lockamy table some values, for example, '64 and '65 are different from the 50th percentile. And the number of data that was used is different from the ones that are on OTIB-38. That's because on OTIB-38, some of -- I think, but I'm not sure, but I think it is

because some of the data were taken off because they are said to be related to an extraordinary incident. I think that's the explanation that I got.

But what I mean is that more important than the use of CER or HIS-20 is the criteria for taking off some of the samples. Because, for example, on the Lockamy table in '64, for example, Lockamy says that there were 4,761 samples. No, I'm sorry, 4,976. And then the OTIB-38 is 4,761. So I have less, around 200 samples less. And the maximum on the Lockamy is 1,000,800 DPM, and the maximum at OTIB-38 is 2,290.

So obviously, this sample with 1,000,800 DPM per 25 (unintelligible) either a huge accident or an error. So it was taken out from OTIB-38. So the discussion of which data stays and which one is taken out is more important than if it's using CER or HIS-20 because both databases have a lot of data.

The second thing is that when you analyze the data, and you made, NIOSH made a model from it, if the rise in intake for various subsequent years. So although for

most of the years the urine, you know, you got the urine for each quarter at the 50th percentile, urine for each quarter, and some of the years were for the year, but when you make the IMBA run and make the intake, then the intake is made for values years in a row because this is a model.

And so when you speak of the 50th percentile, it's not the value that 50 percent of the workers are below that, and 50 percent of the workers are above that. It's just the intake that was derived (unintelligible) to value years of data. So even if you look at OTIB-38, you'll see the (unintelligible) is corresponding to the real urine and you'll see that there are value points that are above that line.

So when we discuss 50th percentile or 95 percentile, we're not talking about real data or all the workers being below 95th percent or 50th percent. We are talking about a model that will reproduce urine data, but we should be aware the manuals, the data will be many of the 50 percentile urine data, will not be above that line.

I don't know if I'm making it clear, but I think if I write this and you read it, it will be much clearer if you look at the graphs. What I want to say is that this is a model, not the intake, just a model. A run, there was an IMBA run into the urine, into the medium which is the 50 percentile. If you're going for the 95 percentile, will happen the same thing. There will be some years or quarters of years that will be above this line and some that will be below that line.

Can you understand me? It's very difficult to explain to you by telephone.

MR. FITZGERALD: I think --

DR. LIPSZTEIN (by Telephone): Yes, because probably you don't even OTIB-38 with you because it some OTIB-38. But it's very difficult to explain. But this is a model. This is not, you're not talking about real data.

DR. ULSH: I only have two questions, and they're not technical because this is deep water and I'd like to see the write up first. But it's not clear to me whether the issues that you're presenting are in SC&A's

estimation SEC issues or more TBD-type issues.

DR. LIPSZTEIN (by Telephone): Oh, no, they are not, no, no. I think there is a model. I think there is a way to reconstruct unmonitored, you know, to apply this model to unmonitored workers. I agree with it, and then we just have to agree on the numbers.

DR. ULSH: Okay, well then I'll hold off on my second question.

MR. GRIFFON: Joyce, did you review this other paper we're talking about? Because you mentioned the two Lockamy papers, but the Donna Cragle --

DR. LIPSZTEIN (by Telephone): Yeah, but then it's just the number of sample, and good thing to do with the Lockamy tables is that they have the percentiles from it. So it's --

MR. GRIFFON: So no concerns that the numbers are a little different?

DR. LIPSZTEIN (by Telephone): I think NIOSH explained it to us, that they have taken out some numbers because they are either related to incidents. Isn't this true?

MR. GRIFFON: No, I'm not talking about the Lockamy stuff compared to OTIB-38 as much as I

am about the year-by-year CEDR versus HIS-20. Those are larger discrepancies. They're just not removing incidents. There's differences in data, and they did explain that as well because people were never in, people pre-1977, as we've discussed, were not in the HIS-20. But there's some large differences in it. I guess we'll leave that alone for now, but I don't know where that --

MR. FITZGERALD: No, I think this point is sufficiently complex. I wouldn't propose we continue on the phone, but the write up will be circulated and it's not in our view an SEC issue, but nonetheless it's a TBD question that we ought to give you, certainly have an opportunity to close on.

Okay? Thank you, Joyce.

MR. GRIFFON: I thought you had some coworker models?

MR. FITZGERALD: No, again, I think much of what Ron is dealing with is OTIB-58 and its application and some of the loose ends that we're trying to resolve, but none of which appear to be SEC issues. And the same thing with Joyce. I think in general, without

getting into the population of these models with data, which is other issues, we're certainly okay on the models.

MR. GRIFFON: And I think from that standpoint I will say because that's still one of my concerns, but I think we've got so many pieces out there speaking to that, I think now we've got to just evaluate the, sort of the weight of the evidence.

MR. FITZGERALD: We've been coming at it from different says.

MR. GRIFFON: We've got, and I admit I haven't even looked at this yet, but NIOSH has looked at the correlator reports as I requested and compared those to the database. And we've got internal comparisons between the databases, and explanations. We've got this last logbook comparison which looks at some raw data compared to the database. So I think we've just got to, we've got all these pieces now, and we've just got to weigh this.

DR. ULSH: Did you mention the progress reports?

MR. GRIFFON: Quarterly reports, progress reports, whatever you want to call them.

MS. MUNN: This is post-April. This issue, these pieces we can put together.

MR. GRIFFON: Yes, I mean I guess what I'm saying is I don't think we need any more pieces from anybody. I think we've got it on the table, and we just have to --

MR. FITZGERALD: Yeah, it has to be developed into a report, and made into analysis and conclusion. And we do have various pieces that have to be woven together, but I think we've got the basics.

MR. GRIFFON: Nothing else on coworker models I take it?

MR. FITZGERALD: No, I want to reaffirm that we have spent a great deal of time on different facets of this. We can only go back to the OTIB-38 debates on 95th percentile. We have spent a lot of time. I think there's a question of data completeness, but other than I think we've done a lot of review on this.

MR. GRIFFON: Well, the only last item I have on here is proof of process and maybe picking some cases that we're interested in.

WOUNDS ISSUE

But the wound scenario question, and I --

Jim, are you still on with us?

DR. NETON (by Telephone): Yeah, I'm here.

MR. GRIFFON: Okay, I mean I guess the very specific question that -- I think I raised this. Actually, I'm sure I raised it -- there were some early write ups, early reports. I think it was in part what put me onto this was reading some of the early progress reports, and noticing that oftentimes the incidents were attributed to wounds, wound scenarios, and then there was a paper, and I must admit I forget who the health physicist was at the time, but he had a write up saying that now that they have wound monitoring, they thought they had a good handle on this. But he -- and this was kind of an historical piece so the first decade, I think, at Rocky, he did have a concern that in the earlier years that this would probably, could have been the most significant internal doses. And they may have been missed since they didn't have this one monitoring technique. And so I was just, it just raised a question in my mind as to whether our model would effectively bound sort of any scenario we could come up with related

to wounds where you could have somebody intake via a wound but didn't know they were wounded and on their routine urinalysis you wouldn't necessarily have indication that they were wounded so you treated inhalation.

DR. NETON (by Telephone): I'm in agreement. I think that we can, the wound dose, the dose that's delivered from a wound is directly related to the amount that becomes systemic, and we've talked about this before. In a sense, you got a release from the wound into the system and that would show up in the urine sample. So it seems like we would model this as a lung count and a lung intake.

And then if the projected bioassay results were overlaid on top of the urinalysis results, you essentially have the same thing. You've got the systemic dose then calculated, and it doesn't really matter whether the material's ingested from the lung or from the wound as long as you, the injection profile shows the same amount of systemic urine for the urine which the systemic burden, you should get the same answer.

But we can do this. We can go back.

We have a wound model in the OTIB on that, I believe.

DR. ULSH: It's in 22.

DR. NETON (by Telephone): So we could go back, and we haven't done this, Mark, which is do a broad comparison of what the TIB-49 calculations would do versus the model might show based on possible urine profiles. So it's systemic, and that's going to deliver a certain dose to the organ. As long as your projected urine excretion curve is the same, you should get the same number.

DR. LIPSZTEIN (by Telephone): Jim, I think that you're right. The only worry I have is for unmonitored workers because OTIB-38 is applied to unmonitored workers and inhalation.

DR. NETON (by Telephone): Right, but then unmonitored workers, oh, I see, the urine sample as the result of unmonitored workers is not necessarily the appropriate one.

MR. GRIFFON: That was sort of the question that you were going to follow up on.

DR. LIPSZTEIN (by Telephone): Yeah.

DR. NETON (by Telephone): We need to go back and re-think this then, because I was

thinking from the other perspective where we have the monitored data.

MR. GRIFFON: Now we don't have a lot of these I think is what Brant's going to say.

DR. ULSH: You're reading my mind, Mark.

DR. LIPSZTEIN (by Telephone): Actually, what you say on the OTIB on monitoring is you have a general (unintelligible) and if it doesn't fit your data you go on and fit it yourself for the TIB. Nothing to discuss on that. I think the issue is unmonitored worker.

DR. ULSH: Yeah, just to elaborate on, Mark, I mean just my comment, keep in mind what we've --

DR. NETON (by Telephone): Yeah, we need to think about this a little more. We'll get back and re-huddle and see what our position is on that.

DR. ULSH: All right, but keep in mind though that in the data completeness review, the 52 cases, we found no gaps.

DR. MAKHIJANI: Oh, correction.

DR. ULSH: In internal.

DR. MAKHIJANI: There were no gaps in the 20

highly exposed cases if I remember correctly. I will check.

DR. ULSH: All right, Arjun, perhaps I should specify what I'm saying. I should be more careful with my words. NIOSH found no suspect gaps. Now I'm not saying that SC&A necessarily agrees with that, but that's what we found.

DR. MAKHIJANI: Okay.

DR. ULSH: And also keep in mind the number of dose reconstructions that we have done and that have required internal coworker data. I think there were a total of around 110 or something, but of those most of those were external. There were only ten or so internal. And I don't even know how many of those were before, you know, in the '50s before the wound counter, the lung counter. So just keep that, it's important to keep the scope of the issue in mind.

DR. MAKHIJANI: We agree there were gaps in the, in our count, that is, one year or more with no monitoring data in the random sample including 73 percent in the 1964 to 1992 with at least, 73 percent of workers with one year

or more of gap. Now when we looked at the 20 cases of high cumulative doses, we concluded that because those records were complete in this definition that you should have no problem in terms of coworker model in principle looking to job types and, you know, some caveats, but there wasn't like an SEC issue there. But on the random sample there were many cases of workers who didn't have any monitoring record for one year or more.

MR. GRIFFON: I do understand the scope, but I just think --

DR. ULSH: I'm not trying to say we should --

DR. MAKHIJANI: And we did not consider this wound question. It was just from the completeness question.

MR. GRIFFON: I think we're, it's a NIOSH action that's agreeable and it leaves it at that.

MS. MUNN: SEC or non-SEC?

MR. GRIFFON: Well, assuming they can demonstrate that it's bounding, I think it's non-SEC.

DR. NETON (by Telephone): Yeah, I think

that you're right, Mark.

MR. GRIFFON: Also, it's very apparent that most people have monitoring data so there's not been many unmonitored for internal. So my sense is it's going to end up non-SEC, but I would like to have an answer.

DR. ULSH: Mark, for clarity could you just restate the action item as you see it because I just want to make sure that we understand --

MR. GRIFFON: I think we want to see a comparison of the, how, whether the coworker model is bounding for wounds for unmonitored, you know, a person who was exposed by a wound but wasn't on a monitoring program.

DR. NETON (by Telephone): And the difficulty of non-monitoring's going to be, essentially, you almost need a coworker wound model which I don't think we have. But then you're going to have to assume at some point that the people with wounds are also included in the urinalysis database and therefore, would be covered by, say if we picked the 95th percentile -- I don't know. I have to think about this, but there are ways around this issue.

MR. GRIFFON: Give us some response. My sense is it's not an SEC, my sense is it's not going to be an SEC issue.

DR. NETON (by Telephone): We'll put it together thoughtfully.

MR. SHARFI: Are you looking for a comparison using coworker as a wound versus coworker as an inhalation?

DR. NETON (by Telephone): Oh, no.

MR. GRIFFON: No.

DR. NETON (by Telephone): I think what we're looking for here is to show that we can handle our current approach with sufficiently, with people who could have had wounds that were unmonitored, and that the coworker data that we're using, the urinalysis data, would be sufficiently bounding.

And we have data, data, and we can handle it. We have a TIB on that. We've got urinalysis data, and if we apply the urinalysis data using the lung model, I'm pretty confident we're okay. But you've got a person that was never monitored, and you apply the coworker lung model, does that bound his potential wound if he's got one?

MR. GRIFFON: I think that's the reason I'm getting a funny look from Mutty probably is if you're unmonitored, how do you know what the, how big the wound was or --

DR. NETON (by Telephone): I think we need to go back and look at the urinalysis coworker model which was not necessarily a urinalysis of everything, wounds, ingestion --

MR. GRIFFON: I even looked at some scenarios of, and I must admit it wasn't wound. I just assumed injection just because it was easier. And I did some scenarios with less than MDA values, and I thought -- these are real rough calculations, but I thought I had some circumstances where the doses wouldn't have been bounding with the inhalation approach.

DR. NETON (by Telephone): That's hard to believe though.

MR. GRIFFON: I know. It doesn't make sense of what we discussed, but --

DR. NETON (by Telephone): If it's not coming out in the urine, we're going to come up with a dose less than MDA values.

MS. MUNN: Is this a scenario we have

encountered in any claimant?

DR. NETON (by Telephone): I guess this followed the scenario, you know, of proving a negative almost, but --

MR. SHARFI: That's where I'm getting confused.

MS. MUNN: Do we have claimants --

DR. NETON (by Telephone): I would agree that there are potentially people out there that could have had a wound that went unkept.

MR. GRIFFON: Well, it's not only this hypothetical thing. It's in the paper, this guy presents in, you know, I wouldn't just say --

DR. NETON (by Telephone): Okay, well that might be a paper that might be helpful.

MR. GRIFFON: When we first talked about wounds, I mean, I thought no big deal because in most cases I could think of if somebody got a wound health physics would know that it was a wound and model it that way and it would be in the rad file. But then this paper describes actually in the early years it probably would not have been necessarily documented or monitored that way. So that's

the context I brought it up in.

MR. FITZGERALD: I think he hasn't seen it, the paper.

MR. GRIFFON: And I'll have to, I can certainly forward the, it's on your O drive. I'll point it to you.

DR. MAKHIJANI: It's a paper that describes the particular process inside the plutonium processing area that have a sharp band that workers cut their fingers on.

MR. GRIFFON: And it even goes on to say, it suggests certain design changes in the glove box.

DR. NETON (by Telephone): It makes you kind of wonder how these people would have been totally unmonitored, but I suppose --

MR. GRIFFON: Right, these people may have been monitored if they were in that area. So therefore, we're going to be able to assign less than MDA.

DR. NETON (by Telephone): Okay, we'll take a look at it and get something on paper.

MR. GRIFFON: Okay, that's all we're asking. And I don't think it's going to be an SEC issue.

PROOF OF PROCESS

I guess the last item, the last item is this question of proof of process and some example or sample cases. And I've tried to, I mean, well, just to go in my parenthetical there, the examples of coworker models I think would be useful. And if the ones that are available, I think it would be good to look at real cases.

And if you need to add an explanation that, you know, as we discussed in the work group we could just, for the time period or whatever, if the current model doesn't display the, we certainly could, you know, that would be certainly appropriate I think. I don't know. The ones we heard this morning I thought we talked about an example foundry worker, but we also said that that may not be possible to find, right?

DR. ULSH: Yeah I do have some --

MR. GRIFFON: I know it's not very good --

DR. ULSH: I do have some thoughts on this, Mark. I do like your suggestion that we actually look at real cases, just point out the numbers to you and let you guys take a

look at them. I think that's a really good idea. And I think that will certainly be possible for internal coworker model, external coworker model, and we are starting to get some in now with Super-S. So I think we can do that. We can provide some examples of you, examples for you in those categories.

Now in terms of uranium foundry -- I'll get to thorium, but in terms of uranium foundry workers in the '50s, what we have shown, at least this morning, and I know that this is all new information to you, is that those folks were indeed monitored. So dose reconstructions for uranium foundry workers in the '50s aren't going to look any different than other monitored workers in the '50s. It's going to look the same because they were monitored. So I don't know if there's still a need to do that or not. I guess I'd like to get your pulse on that.

MR. GRIFFON: Right, I'm not sure either. That was new information this morning.

MS. MUNN: It seems to me you've got monitored, when you have monitoring data, you use the data you have.

DR. ULSH: I think our action item on that was to point out to SC&A or to SC&A and the working group with the monitoring data for the foundry workers.

MS. MUNN: To show that they were in fact monitored.

DR. ULSH: Show that they were monitored, right.

MR. GRIFFON: I think we have that as another action item.

DR. ULSH: And if we do that, and let's just assume for the sake of discussion that we do that and you're satisfied that, yes, they were monitored, then my question is do we still have a need for an example for uranium foundry worker in particular?

MR. GRIFFON: I wouldn't think so.

What do you think, Arjun and Joe?

MR. FITZGERALD: Examples of foundry workers at the factory would establish that there is data, that they were monitored.

DR. MAKHIJANI: Well, if you're limited you might not find as many examples always. It would seal the question. If you have the data and you can apply it in an example, but I

think if we can look at the data and look at the practice in terms of weekly, biweekly, monthly badging, the kinds of data that you circulated for 1953. If we can see that is more pervasive than the data were actually there maybe it might be equivalent. I just have to think about that a little.

MR. FITZGERALD: Yeah, I think -- I don't want to conflate the question of completeness versus proof of process either because if we demonstrate completeness, I'm not sure that's different than what we're trying, I think, to do here. So I don't know. If you can provide the data, I'm not sure that doesn't answer the question we have.

DR. MAKHIJANI: It would answer the question we had on the --

MR. FITZGERALD: Foundry workers.

DR. MAKHIJANI: -- the completeness thing. You know, we identified gaps among the non-plutonium workers, and identified foundry workers as ones having potential for higher exposure, and if they have data, then that completeness, if they were systematically monitored, and they have been identified

internally as having potential high exposures then that piece of it would go away.

MR. FITZGERALD: Yeah, I think we're talking about really the models themselves. Whether it's 49, 38, 58, we're looking at how they would be applied in practice, and I think that's the -- am I right? That's kind of --

MR. GRIFFON: Well, those three we agreed --

MR. FITZGERALD: Beyond those three, I guess, is the question we've got.

MR. GRIFFON: Well, I mean, it may not be the uranium foundry workers. It may be these other uranium workers --

DR. MAKHIJANI: It may be.

MR. GRIFFON: -- in 881. We know they're not monitored.

DR. MAKHIJANI: Well, the 1950s.

MR. GRIFFON: Is that right?

DR. ULSH: That's going to look like the external coworker model.

MR. FITZGERALD: Yeah, that's what I'm kind of getting at, that when you get to that issue, it's really going to be the same modeling.

MS. MUNN: Right, and when you have the data

for the ‘50s folks, you know, you’re going to use the data. You know how you’re going to get that.

MR. GRIFFON: I was thinking there was a separate uranium and plutonium external, but it’s all rolled into one external for the coworker model.

DR. MAKHIJANI: I think the more outstanding question is the one we raised actually about Building 881, understanding that it’s not the same kind of issues as the foundry. It’s the back extrapolation from 1960 and ’61. We’ve said that the coworker model looks okay when you look at the 1960 and ’61 application and covers the situation adequately, but the back extrapolation didn’t seem as convincing. And so how that back extrapolation is going to be done is still a question.

MR. GRIFFON: Now what you’re telling me if you give us a real case it’s going to be the regular model. We’re not going to see anything --

DR. MAKHIJANI: We’re not going to see that because the back extrapolation, the questions that we raised in relation to that are (a)

that typical production was lower, doses would be lower, and (b) above the infrastructure in its relationship to dose. I don't know how we're going to get there. I haven't thought about it enough. We haven't discussed it.

MR. FITZGERALD: Not that aspect, but I think that's --

DR. ULSH: Yeah, really, I mean, to be fair we just gave you our report last week, and you might need a little more time to digest that. And if you have more comments then --

DR. MAKHIJANI: You know, when I present things, of course, they've been vetted internally, and just as the principle author, I'm just saying things that we've vetted. So this thing we have not vetted internally.

MR. GRIFFON: What about the question of the thorium example?

DR. ULSH: Yeah, I wanted to get to that. All along it has been our position that there were not significant, there wasn't the potential for significant thorium exposures. Now, I know that I don't want to assume that we have concurrence with SC&A on that particular piece. And I don't want to upset

the apple cart here on the agreement that we hatched out with thorium.

But what we would do for a situation where there was someone with thorium is, I mean, if they had bioassay, we would use it. And if they don't, I mean, we would have to have some kind of an indication that they had a potential for intake, say, for instance, maybe they were involved in the thorium strike. And we've laid out our approach on that. I mean, it relies on NUREG-1400, which I know that SC&A has some reservations about still.

In terms of in this context though, Mark, where you're asking for proof of process for thorium workers, I mean for people who might have had thorium, I'm not going to be able to present you with a real case on that because the numbers were so low, you know, number of workers were so low, I mean, I haven't seen a case with --

MR. GRIFFON: To date you haven't had a claim that you'd use that modeling?

DR. ULSH: That's correct. We were using NUREG-1400 to show a bounding approach and

show that even under these boundings, what we consider bounding scenarios, there's not a single potential so we don't really have to deal with it.

MR. GRIFFON: You haven't found anybody that worked in operations or in those areas? I'm not sure how you're defining who. I guess that was part of the proof of process. How do you define if someone was a thorium, potentially exposed with thorium.

DR. ULSH: I won't tell you that we know every single name of every single person who was involved in it, but we do know quite a number of them. The thorium ingot operation in 1960, there was a list in Kittinger's logbook that covered that time period that said these people were involved in the operation. I don't recall that any of those were claimants, but don't hold me to that.

In terms of the thorium strikes, we know a couple of people who were involved, and we know that the numbers were small. But I can't think of an example of a completed dose reconstruction that we have done on a person who was involved in, off the top of my head,

so I don't know if I can present you with a real --

MR. GRIFFON: I think thorium, you know, if you presented today it would be a hypothetical example with NUREG-1400.

DR. ULSH: That's what we had today.

MR. GRIFFON: And I think you already posted one of those. I don't know.

It doesn't help anyway.

MR. FITZGERALD: I really think the three we just talked about, the ones that we're looking to validate so to speak on this.

MR. GRIFFON: That might be the only one. I was just exploring.

DR. ULSH: Internal coworker, external coworker, Super-S. Okay, we can do that. We can do that. We can give you lists of claimants that fall into those categories.

MR. SHARFI: Any or partials? I mean partial assessment.

DR. ULSH: We'll work out the details.

MR. SHARFI: Partials.

DR. ULSH: Yes.

MR. GRIFFON: The Super-S or partials.

MR. SHARFI: Probably the ones that we've

done. The ones we'll probably shoot for will be the easier one.

DR. ULSH: Yeah, that's true. I mean, the Super-S is --

MR. ELLIOTT: Partial meaning they're an underestimate?

DR. ULSH: Yes.

MR. SHARFI: Most likely. First one we should (unintelligible) the lung cancers, and work our way to the harder ones.

DR. ULSH: We'll give you what we've got. Keep in mind though that Super-S is, we're just working those in the claimed process so we'll give you what we have.

MR. GRIFFON: And I think that's probably the third in importance really.

MR. FITZGERALD: Right, and we're sampling from this rather small, I think somebody said ten internal coworkers or is there something different?

DR. ULSH: Something like that.

MR. GRIFFON: Now the only other, I guess the other sort of example I was thinking of is one of these, I mean, you mentioned that you use other, well, I'm not sure we need that,

but I'm just thinking out loud here. The other types of dose reconstructions that are out there are these ones that you used, other techniques to fill in, for lack of a better word, gaps. You know, you used your other approaches, your LOD over two or LODs or whatever. Rather than a coworker model you used other techniques to fill in the gaps, but I'm not sure that's going to shed much light on what we reviewed here.

MR. FITZGERALD: I think that would be rather conventional, I mean in terms of missing data, bridging missing data in terms of using LOD over two. I think that's pretty much the same process we're seeing elsewhere, right?

MR. GRIFFON: Yeah, yeah.

DR. ULSH: So do you want to stick with these three?

MR. GRIFFON: Yeah.

DR. MAKHIJANI: Yeah, I think so.

MR. ELLIOTT: At the risk of upsetting this tentative agreement, I thought I heard earlier that you wanted us to try to show where we attended to unmonitored situations by using

missed dose, that the missed dose actually, did it cover, did it address, did it envelope, did it include the unmonitored?

MR. GRIFFON: Yes.

DR. ULSH: Are you talking about in the wound model discussion?

MR. ELLIOTT: No.

DR. MAKHIJANI: These are the gaps.

MR. ELLIOTT: Where we took the unmonitored to zero and narrowed down through the unmonitored. The badge went unrecorded, you know. Didn't we agree that we would provide you an example showing you that either the missed dose approach, LOD over two or LODU whatever did include, did bound, did cover, envelope, to use a Joe term here, envelope the effect.

DR. MAKHIJANI: You're right. I think we authorized that.

DR. ULSH: Okay, some of those that we provide in internal coworker and external coworker --

MR. ELLIOTT: And have us to come back later and say we didn't do something.

MS. MUNN: So they'll be covered by --

MR. GRIFFON: Make sure, yeah.

DR. MAKHIJANI: We actually agreed on that.

MR. ELLIOTT: This is for the '69 timeframe with the unmonitored zeros, that are truly not zeros. We all agree that they're probably not zeros. But that our missed dose approach either addresses that properly, or if it doesn't, what are we going to do about it, I guess.

DR. MAKHIJANI: Yeah, and is there a, this is not a sort of principle thing. It's in relation to an action on the question of the zeros when there was no monitoring, what action would be taken because I think that might be an important issue in its own right. I don't know whether you think it's an important issue in its own right that that should be settled in this context of whether it can be bumped to some other context.

DR. ULSH: Well, I think what Mark suggested was we'll present you with an example of, say, external coworker model in OTIB-58 as it is now. And then we'll make a note if we were to exclude zeros, here's the values that would be applied in those years.

Right? Is that what you said, Mark?

DR. MAKHIJANI: Yeah, I'm not talking about that in the context of proof of principle which I think is fine. I'm talking about that as an issue in its own right independent of dose reconstructability is that when you come to making a decision there's a question of having a database and would it be legitimate to use that database. If you could demonstrate we're technically okay, for instance, if we legitimately use that database knowing that it had this kind of information. I think that's an important thing because it's the first time you're going to confront that issue. There is a kind of a resolution that's possible about it just on its own merits. And I think --

MR. GRIFFON: That probably is something to consider because we're acknowledging that at least some of those zeros and certainly see from the --

MR. ELLIOTT: They're not true zeros. As we said before, they're not true zeros.

MS. MUNN: So the real question is --

MR. GRIFFON: Someone could say you're using

a database that you know, you've acknowledged on the record, is, you know --

MR. ELLIOTT: Essentially, we're creating a database, a distribution of dose including a zero which is not a zero.

MR. GRIFFON: Right.

MR. ELLIOTT: We shouldn't do that.

DR. MAKHIJANI: And I think we've said that in the record here. I think there's been real progress, that we have agreement about that. We're clear here about all the terms and what we mean by them. I, you know, having been on the outside on this very same question in a different context where I came across this non-monitoring data for an air release data radionuclides through stacks. I'm on the record as having taken a very dim view of using this kind of information. And so I just think that this is an issue in its right, and there is a solution to it, and --

MR. ELLIOTT: But I don't know where you're going with this. I think we agree with you that it's, we need to do something right here.

DR. MAKHIJANI: No, no, I agree. I think we have an agreement. All I'm saying is that

agreement going to be a formal part of this process of completing and closing out the SEC process or is it going to be a proof of principle that we could do it one way or we could do it another way and it doesn't really matter.

MR. GRIFFON: In other words, he's saying are you going to leave the zeros in but demonstrate that it wouldn't matter or are you going to actually just say, you know, we've identified this or do you think it's best to just remove them all.

DR. WADE: Systemically solve the problem.

MR. ELLIOTT: I think we need to systemically solve the problem.

MS. MUNN: What's the global policy?

DR. ULSH: We won't use that data.

MR. ELLIOTT: We should never use bad data. I think we're in agreement on that, but I still think you've asked us to show, we made a statement earlier today that we were operating under a belief that the missed dose concept bounded the unmonitored piece. Now to come back to you and say we still believe that, we need to show that in proof of principle here,

proof of process. If we come back to you, and we say we don't think that that's right, and I'm not saying we don't, I think we agree we don't, do we still have to do that? Do we still have to show you an example or should we just go forward and change it. I think we should just go forward and change it.

DR. WADE: Solve the problem.

MR. ELLIOTT: Yes.

MR. GRIFFON: I agree.

MR. ELLIOTT: Stop this wrangling back and forth. Let's just accept it and move, make the change.

DR. MAKHIJANI: Agreed.

MR. ELLIOTT: Thank you.

MS. MUNN: My only concern with that is that if by doing so it appears that we over-inflate the calculated dose, then again, we're misleading everybody if we do that. So I guess seeing what the difference would be --

MR. ELLIOTT: Would be informative for you.

MS. MUNN: Would be informative.

DR. ULSH: I had it earlier. I can tell you qualitatively, Wanda, in here somewhere in this box file.

MR. ELLIOTT: I think we can do that, too. I think we can be informative and --

MR. GRIFFON: I don't think it's going to make a huge difference.

DR. ULSH: Not at the 95th percentile.

MR. ELLIOTT: Let me ask this question. Do you have any knowledge of any other site situations where we encountered unmonitored or people who were badged but the badges were never read and we've included that data, those zeros? Do you have any idea that we had that anywhere else?

MR. GRIFFON: Outside of Rocky Flats?

MR. ELLIOTT: Outside of Rocky Flats.

DR. MAKHIJANI: No, I know this issue has come up in Fernald in relation to the stack monitoring data, and it is an SEC petition.

MR. ELLIOTT: I think the message here is we better take a good hard look and make sure that we're not using bad data to create distribution.

RECAP OF ACTION ITEMS

MR. GRIFFON: Can I just go back over a few actions just to make sure. Going back to this morning I have NIOSH will post lab worksheets

-- am I getting that right? And do you have a timeframe on that?

DR. LITTLE: 'Sixty-eight, '69 for the foundry workers.

MR. ELLIOTT: How soon will you post I think is where he's going.

MR. GRIFFON: I was asking for what he answered, but I'm assuming as soon as possible.

MR. ELLIOTT: As soon as possible.

MR. GRIFFON: Can I ask just to answer to that question '68, '69 for foundry workers. Are there any of these other lab worksheets that could be -- they stop in '70, right? I'm going over old ground here I think, but --

DR. LITTLE: Yeah, well --

DR. ULSH: The zeros with the arrow down the page.

DR. LITTLE: Oh, yes, the zero, that stops. Well, we haven't actually --

DR. ULSH: Those are film worksheets. They're going to stop in '70.

DR. LITTLE: Absolutely, they'll stop in '70. The question was do they continue into '70, and I can't answer that question.

MR. GRIFFON: And is there anything prior to just for this, if you're doing foundry workers, do we want some in the early years also?

DR. ULSH: Well, we've got the '50s that we're going to provide, the monitoring data like the example.

MR. GRIFFON: Yeah, right.

DR. LITTLE: Well, what do you want to see? That's the question. Do you want to see actual data?

MR. GRIFFON: We have these lab worksheets for foundry workers for different times for those.

DR. LITTLE: Well, you know, as you saw in that table for three-quarters of 1969 you're going to have a zero with a line down it. For '70, I think for fourth quarter '69 you're going to see actual numbers.

MS. MUNN: Now wait, you've lost me again. I thought we were talking about '50s and all of a sudden we're back in '69.

DR. LITTLE: I confuse myself.

DR. ULSH: Let's make it clear we're talking about foundry workers. What we're going to

provide as I understand it is these lab worksheets that show the zeros with the arrows down it in ’69 and ’70 for the foundry workers. In addition, we’re going to provide what Arjun’s holding up right now, which is like the example that I passed around this morning, the Building 44 that includes the foundry workers, their dosimetry results just like the example.

MR. GRIFFON: I understand. If you can do a couple of those --

MR. ELLIOTT: Different years.

MR. GRIFFON: Between ’50, what is that, ‘54?

MS. MUNN: That’s ’53.

MR. GRIFFON: ‘Fifty-three, between ’53 and ’69.

DR. ULSH: We’ll provide you with more of this.

MR. GRIFFON: Not the whole set, a few examples.

MS. MUNN: Very few.

MS. JESSEN: That’s two action items so far.

DR. ULSH: Two action items so far?

MS. JESSEN: I’ve written down on this

clarification.

MR. GRIFFON: Well, I thought it was all part of one, but it might be two.

MS. JESSEN: Well, break it down into dates.

MR. GRIFFON: The second one is SC&A will contact the petitioner regarding thorium question just to see if he has anymore information on source term.

The third one, and I may have missed something so we'll go to you all at the end. Third is NIOSH to provide identifiers for neutron data needed by Ron.

And then the fourth one I have is there's this question in TIB-58, table 07-1 of the non-penetrating versus penetrating. That's an ongoing correspondence between --

DR. ULSH: Yeah, I just sent something to Ron this week, so it's probably --

MS. MUNN: And not an SEC issue.

DR. ULSH: No, well, no.

MR. GRIFFON: That's non-penetrating, I don't think that one is.

And then the only other one I have I think is the three examples, and I may have missed some.

DR. ULSH: Examples of the three different types, proof of principle, but we missed wound modeling.

DR. WADE: Jim was going to think --

MR. ELLIOTT: And Joyce was going to provide something in explanation of the --

MS. MUNN: She was going to provide graphs and things.

MR. ELLIOTT: Right, further elucidation of what the issue is.

MR. FITZGERALD: Well, actually we have her write up, and what I'm going to try to do is get that to you.

MR. GRIFFON: Joyce's write up modified maybe.

MR. FITZGERALD: Right, right.

MR. GRIFFON: Is there anything else?

MS. MUNN: I had SC&A's response to NIOSH on the logbooks and reconciling the differences.

MR. GRIFFON: Oh, yeah.

DR. ULSH: Your visit next week.

MR. FITZGERALD: Oh, the review next week. That's right. That's a deliverable. There's going to be a number of written deliverables that we'll provide as we have the others, and

that will be part of the extension of logbook review. There will be one on internal that will include Joyce's, and you just got Ron's which is in Privacy Act review. You might also see D&D which, again, is not an SEC issue, but just so you have that section.

MR. GRIFFON: Yeah, these are from old --

MR. FITZGERALD: These are just individual sections that we'll make available as soon as we can and go through this process and make sure it's all PA cleared. And it will help us put the report together so we don't have to do that 500 pages at once.

DR. MAKHIJANI: It's not a proof of principle. It lists an EU back extrapolation method. Is there going to be some clarification on the part of NIOSH or do we just write it up or how do you want to proceed on that?

MR. GRIFFON: I think they've given us a report on that, right?

DR. ULSH: We've given our position.

MR. GRIFFON: My sense is that NIOSH has provided, so I would say include your analysis of that in your final write up under EU.

That's part of your final write up. Your old reaction is your final write up.

MR. FITZGERALD: No, right, there's a number of things we didn't even touch on today that were included in NIOSH responses that and God knows what else, but we'll certainly address that in the report.

MR. GRIFFON: Any other actions from today?

MR. BUCHANAN (by Telephone): This is Ron Buchanan. I just wanted to clarify with Brant that hold off on those ID numbers. I'm going to send you an e-mail to clarify exactly I need so you don't go through a lot of work on material I don't need. So I'll send you a clarification e-mail on that.

DR. ULSH: Okay, thank you, Ron, I appreciate it.

MR. ELLIOTT: We certainly made a lot of progress today. Would you be kind enough, Mark, to, if you could, summarize what issues remain as SEC-related issues? I think we've moved several into the site profile dose reconstruction category, but I'm not clear what remains as an SEC-related issue that we're still tracking here.

MR. GRIFFON: I think this question of the completeness and data reliability still is hanging out there. We certainly got some much more information today including the, a little more knowledge on the monitoring practices of the early time period. But I still think we haven't completely closed that issue.

All indications are that the thorium issue is closed as far as an SEC issue. We are going to give the opportunity to petitioners, since we did offer it before, but if we don't see anymore in the way of source term information, I think it's definitely closed.

The data integrity, logbook, safety concerns are all closed as far as SC&A agrees that there are no systemic problems identified. The only thing hanging in the one report is the logbook HIS-20 comparison, I think, and resolving the sort of differences in numbers there. I don't think there's really a difference, reconcile those.

MR. ELLIOTT: But do you see that as an SEC-related issue or?

MR. GRIFFON: Well, only in the sense that

gets at the question of the data used in the coworker models.

Super-S is resolved. Neutron dose questions appear to be, I mean, I'm convinced that they're site profile issues. I would like to hear back, you know, if Ron got those identifiers and can calculate N/P ratios for this time period, then I think it's definitely a site profile issue.

And then the coworker models, the models themselves I think we agree on. I think the only question is the data populating the models so that's that final question.

So really it's data completeness and then this data reliability which are woven together a little bit. We've come a long way on that even I think. And the one scenario that I don't think that's an SEC thing, but I think it's easy enough to put to bed. I think that we should do it.

Do you agree with me, Joe and Arjun?

MR. FITZGERALD: Yeah, I think that covers the ground.

DR. MAKHIJANI: Yes.

DR. ULSH: A couple of remaining questions,

you might be getting to this, Mark. I think in general the big action item is, you know, or the next thing that's going to happen is SC&A's going to issue a final report. When might that happen?

MR. GRIFFON: Right, when did we, we talked about --

MR. FITZGERALD: We're talking about certainly trying to do that by no later than early April, meaning that we're assuming we will need to finish up PA review. Certainly incorporate the results of next week's sampling at Rocky in Denver, and also to do the reconciliation, the reflection that we want to do on the specific comments you just gave us this week. And I don't want to underestimate the amount of work entailed in that because we're talking many, many specific comments. So we're already starting to do that, and we've given you a lion's share of the write ups. But those write ups will have to be reworked, I think, to reflect a lot of what we've done this past week. So we're aiming for sometime between three-to-four weeks from now to not only have it written,

but also hopefully have it Privacy Act reviewed and available which, I think, will meet the objective that we discussed before to give the public and the petitioners at least a month, four weeks, with the document when it's available.

MR. GRIFFON: So the first week in April we're saying.

MR. FITZGERALD: Yeah, I think that's going to entail some iterative -- I'm glad you offered to do that. We're going to have to have the ability, I think, to do things in real-time just because of the tightness of time and trying to make sure if we need to run something through, we'll try to do that directly rather than try to send you a document that goes back and forth. We don't have time to do that.

MS. HOMOKI-TITUS: It would be really helpful when you send documents to us if you give us either a drop-dead deadline of when you want them back or a priority list.

MR. FITZGERALD: Right, and I think what's mitigating this is the fact that the most significant parts of this document you've

seen. So really we're refining those important parts of the document. Now you're not going to see them for the first time. You'll seem the refinements. In other words, what we've just discussed so the rest of it, the D&Ds and the internals, Ron's piece, those are pieces I think we're in agreement so I don't think there's going to be as much controversy in terms of putting those into final form.

DR. MAKHIJANI: Yeah, and there's going to be no new cases and things so that since you've already reviewed, you've already reviewed all the tables, I mean, unless there's some stuff that comes up on foundry and what we get from NIOSH, they're not going to be, the data completeness, I don't know what's going to happen in the foundry discussion.

DR. WADE: Let's talk as a work group, let's talk a little bit about how this will likely play out. I think it's worth spending a little bit of time.

So we're likely to see an SC&A report at the beginning of April. It's entirely

possible that the next thing that will happen will be the Board meeting in May where the work group will report out. Now, following our normal procedure, the work group isn't going to give a recommendation to the Board. The work group is going to report out its findings, and there'll be an opportunity for Mark and other members to speak. And then the Board will take up and vote on the SEC petition that's in front of it.

Now, again, you could follow a different path which would be the Board, the work group to make a recommendation to the Board, but that's not how this body has done its business. So again, in May, the first day of the meeting will set it up. There'll be a detailed work group report made, an opportunity for questioning, interaction, comment by petitioners, presentation by NIOSH, and then the Board will take up a vote sometime during those three days.

MS. MUNN: We have not had quite such an extensive, long-term series of issues in other work groups that we've had in this one. This one has certainly been the granddaddy of all

work groups in terms of how many boulders get climbed and how many sentences get parsed. I would hope that the work group would have an opportunity to meet once after SC&A's report is out just to make sure that we really don't have any unresolved issues when we go to the Board.

MR. GRIFFON: Yeah, we may want to do even a phone meeting.

DR. WADE: Phone call, it would be appropriate.

MR. PRESLEY (by Telephone): Hey, this is Bob Presley. I agree with that 100 percent.

MR. GIBSON (by Telephone): This is Mike. This has been an exhausting process that just in taking the role of the Savannah River site and some other things, it looks like it just may be typical of what's coming down the road. So I just think we all need to get prepared for that.

DR. WADE: Wise counsel.

MS. MUNN: The SC&A report is going to be out by the first week of April, then, Mark, you're going to have a subcommittee meeting on the 11th.

MR. GRIFFON: Yeah, but we've got like three meetings that week.

MS. MUNN: We do.

DR. WADE: It's too early, too. How about the middle of the next week, the 18th?

MR. GRIFFON: The 17th or 18th have a phone call?

DR. ULSH: Now is this a call involving SC&A and NIOSH or just the working group?

MS. MUNN: I think it's the cast of thousands just to make sure --

MR. GRIFFON: We probably need everyone there.

MS. MUNN: Yeah, without everybody there if there are any nits to be picked then we'll --

MR. GRIFFON: Let's set it up as a phone call the 17th, 18th.

UNIDENTIFIED: The 17th is tax day so you may not want to deal with that.

MR. GRIFFON: Why don't we say the 19th.

DR. WADE: Ten a.m.?

MR. GRIFFON: The 19th at ten a.m.

DR. WADE: A telephone call?

MR. GRIFFON: Let's plan it as a conference call, but if, depending on a change, if we see

the report and we think we need a face-to-face, we can maybe work around.

MS. MUNN: That's way too early. Can I persuade you to do it at 11 a.m., please?

MR. GRIFFON: What's that?

MS. MUNN: Could I persuade you to do it at 11 a.m. your time?

MR. GRIFFON: Yeah, 11 a.m.

DR. WADE: Mike?

MR. GRIFFON: Yeah, Mike.

MR. PRESLEY (by Telephone): No, this is Bob Presley. What day is the 19th on?

DR. WADE: Thursday.

MR. GRIFFON: Thursday.

MR. PRESLEY (by Telephone): Thursday? I have a problem with that. Is it going to be a phone call?

DR. WADE: Yes.

MR. GRIFFON: Yeah, most likely.

MR. PRESLEY (by Telephone): Okay, I can make a phone call. That's no problem.

DR. WADE: Tentatively a phone call, 11 a.m. eastern time on Rocky Flats. Mark, as chairman, will reserve the right when SC&A's report is out to poll the group about the

possibility of getting together face to face, but right now it looks like a phone call.

MR. GRIFFON: Any other old business?

MS. MUNN: The only other request is may I also have a copy of that CD, the 200 page document we discussed this morning?

DR. ULSH: I'll get it to you, Wanda.

MR. GRIFFON: And can we get it on the O drive?

DR. ULSH: Yes.

MS. MUNN: I need a CD.

MR. GRIFFON: Wanda, wants a CD.

DR. ULSH: Okay.

MR. GRIFFON: I think we'll close now on that note. Thank you.

DR. WADE: Thank you all very much. We're going to go away.

(Whereupon, the working group meeting concluded at 5:00 p.m.)

CERTIFICATE OF COURT REPORTER

STATE OF GEORGIA

COUNTY OF FULTON

I, Steven Ray Green, Certified Merit Court Reporter, do hereby certify that I reported the above and foregoing on the day of March 7, 2007; and it is a true and accurate transcript of the testimony captioned herein.

I further certify that I am neither kin nor counsel to any of the parties herein, nor have any interest in the cause named herein.

WITNESS my hand and official seal this the 6th day of April, 2007.

_____

STEVEN RAY GREEN, CCR

CERTIFIED MERIT COURT REPORTER

CERTIFICATE NUMBER: A-2102